Midwest Engineer

SERVING THE ENGINEERING PROFESSION

WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

CHRISTMAS, 1950

WSE MEETING NOTICES—PAGE TWO

Vol. 3 DECEMBER, 1950 No. 4

IN CHICAGO AND NORTHERN ILLINOIS...

Industries have Room to Grow

"The lofty oak from a small acorn grows"

Lofty oaks can't grow from little acorns without room for deep roots and spreading branches. And room to grow is as essential to industry as it is to mighty oaks.

Here in an area of 11,000 square miles, Chicago and Northern Illinois, there is a multitude of desirable plant sites all within easy access to the greatest industrial center of the United States, and yet all offer that advantage which is so essential in these days of industrial expansion—*decentralization and room to grow.*

Add to this the tremendous facilities in Chicago and Northern Illinois for transportation, marketing, research, education, culture and good living and you have a combination of industrial advantages unequalled elsewhere in the world.

Whether the requirements of your business are those of a characteristically compact industrial area or those to be found in smaller but easily accessible cities beyond, the Chicago and Northern Illinois area offers the wide diversity to include the type of space you need.

A LETTER TO US . . . describing your requirements will bring you a careful analysis of this area's advantages as they apply to your business. Or, if you wish, we will send you a carefully screened list of the available buildings or sites that would be suitable for your operations, based on the information you give us. We keep all such inquiries confidential. Just write us.

Industries in the Chicago Area have these outstanding advantages: *Railroad Center of the United States • World Airport • Inland Waterways • Geographical Center of U. S. Population • Great Financial Center • The "Great Central Market" • Food Producing and Processing Center • Leader in Iron and Steel Manufacturing • Good Labor Relations Record • More Than 2,600,000 Kilowatts of Power • Tremendous Coal Reserves • Good Government • Good Living • Good Services for Local Tax Dollars.*

TERRITORIAL INFORMATION DEPARTMENT

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Serving the Engineering Profession

December, 1950 CONTENTS Vol. 3, No. 4

COVER CREDIT

Winter, 1950, is one of three seasonal covers published each year by WSE. Photograph, courtesy of the Public Service Company of Illinois.

December 13, Professional Women's Council

SUBJECT: ENGINEERING EMPLOYMENT

Engineering Societies Personnel Service's manager, **Joseph H. Decker** will be the guest speaker at the Women's Council meeting, Wednesday, December 13, at 7 p.m.

Mr. Decker will discuss employment in the engineering field generally and how it is affected by present day demands. He will also give pointers on applying for employment.

Joseph Decker, a Lt. Commander in the Naval reserve, spent two years in the South Pacific with the Seabees, and has had wide experience in his field of engineering personnel and employment service.

Come early for the get-together dinner before the meeting.

December 18, Steel Mill Electrical Equipment

SPONSORED BY THE ELECTRICAL ENGINEERING SECTION

Mr. W. B. Ferguson, (WSE), electrical engineer with Freyn Engineering Co. will present a paper on "Steel Mill Electrical Equipment at this Monday night meeting of the Electrical Section. Mr. Ferguson was formerly associated with Carnegie-Illinois Steel Corp. and Westinghouse Air Brake Co., as chief engineer.

At 7 p.m. a color sound film "Steel-Man's Servant" will be presented by U. S. Steel Corp.

January 8, Employment Situation

SPONSORED BY THE BRIDGE & STRUCTURAL AND TRANSPORTATION ENGINEERING SECTIONS

The program for this Monday night joint meeting will be a panel discussion of "Employment and Advancement Opportunities for Engineers." The panel will be composed of **Henry T. Heald,** (WSE), president of Illinois Institute of Technology, **John F. Seifried,** of Ceco Steel Products, **Jay Hunter,** Personnel Manager of Illinois Bell Telephone Company, **H. P. Sedwick,** WSE president and **Dr. Gustav Egloff,** 1949-50 president of WSE.

January 10, Third Profits Seminar

SPONSORED BY THE JUNIOR DIVISION

"What is the Function of Investment in Our Economy" will be the subject of the Junior Division's meeting, Wednesday, January 10, at 7 p.m. **Mr. K. V. Zwiener,** vice-president of Harris Trust Co. will speak.

This will be the third in a series of four seminars on "Profits and Survival," all moderated by **Daniel K. Chinlund,** (WSE).

January 13, Video Station Excursion

NBC television studios will be the site of the next WSE excursion. Members and guests will meet at 1:30 p.m. and tour until 4 p.m.

The tour will be divided into two parts, one to start at the TV studio in the Merchandise Mart, 20th floor, and the other at the Transmitter in the Civic Opera Building.

The excursion will include a closeup view of the equipment in studios and master control room, rehearsals in progress and the transmitter equipment.

Get your reservations in early. Call RAndolph 6-1736.

January 15, Quality Control

SPONSORED BY THE COMMUNICATIONS ENGINEERING SECTION

Mr. Arthur G. Dalton of the Western Electric Co. will speak on "Specification, Measurement and Control of Quality," at the Communications Section meeting, Monday, January 15.

Mr. Dalton is superintendent of Quality Control, and is exceptionally well qualified to discuss the fundamental concepts of quality control as related to satisfactoriness of a product and its cost.

COME VISIT HEADQUARTERS DURING THE HOLIDAYS

SEE OUR CHRISTMAS TREE HEAR THE CAROLS

★

THE OFFICERS AND BOARD OF DIRECTION OF THE WESTERN SOCIETY OF ENGINEERS EXPRESS THEIR WHOLEHEARTED GOOD WISHES TO ALL MEMBERS AND THEIR FAMILIES FOR A VERY MERRY CHRISTMAS AND A HAPPY AND PEACEFUL NEW YEAR

H. P. SEDWICK,
PRESIDENT

Here's WSE's

Recipe for an Ideal Thursday Noon

1. **Take a generous portion of good food (for just $1.15)**
2. **Add a dash of an entertaining speaker (different subjects every week)**
3. **Pour in a large part of society fellowship (don't skimp, there's more)**
4. **Mix well and you have**

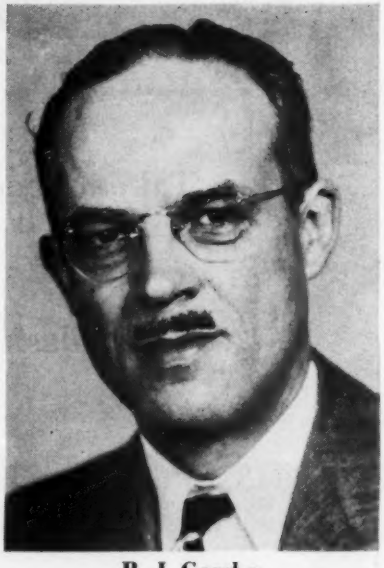
WSE's Luncheon-Meeting

Every Thursday from 12:15 to 1:30

Automatic Transmissions for Automotive Use

by R. J. GORSKY
Assistant Staff Engineer — Transmission Division
Buick Motor Division
General Motors Corporation

This is the story about Buick's Dynaflow Transmission which started the movement to torque converter type transmissions in 1948. Automatic transmissions are meeting with customer approval as is evidenced by the percentage of transmissions of this type now being built and sold. Experimenting, testing, and developing continues to go on in hopes of arriving at automatic units, which will be still more to the liking of the buying public.



R. J. Gorsky

Automatic transmissions for automotive use appear to be simmering down to units incorporating a Fluid Torque Converter, as evidenced by all new designs put on the market in the past three years. This is the result of a tremendous amount of design and development work which has taken place during the past one and one-half to two decades. In analyzing the progress made in transmission design, it may be well to quickly review the need of a transmission and some of the fore-running designs.

The internal combustion engine has certain short-comings which necessitate the use of a transmission to enable its performing the requirements asked for by the driving public. First, an internal combustion engine will not run at low speeds—it will stall. Second, its output torque is low at low speeds and this is when maximum driving torque is required to get a car underway. A larger engine would help this condition, but this would increase the cost and reduce the overall driving efficiency, since only a small percentage of the available power would be used at cruising speeds. And third, it is not practical to make an engine which will run clockwise and counterclockwise.

In view of this a transmission is used to adapt an internal combustion engine to the power requirements of an automobile.

Try Electric Transmissions

Some years ago electric transmissions were tried. These converted the engine power into electrical power and then back again to mechanical power. The parts needed for this construction are costly and heavy and the power losses in making these transitions are appreciable. This type of drive is, however, now being used extensively in diesel-electric locomotives, because it is smooth and can develop high starting torques. The cost, weight, and efficiency factor for this application are of course evaluated on a different basis.

Friction drives have been tried and found to have the desirable features of smoothness and speed reduction. However, friction surfaces capable of taking the drive loads required by present day engines have not been found. This type of transmission has found some application for small industrial speed reducers.

Planetary type transmissions were used on many early vintage cars. These generally had only one forward speed reduction and direct drive. Another planetary set was usually used to obtain reverse.

Sliding Gear Reliable

The sliding gear transmission was used on many early cars and was used practically exclusively in the nineteen-twenties. During the many years that it has been used, it has become a relatively simple and reliable unit. The addition of synchronizers has simplified shifting operations that a driver no longer has to be a timing expert to avoid clashing of gears. Some clutching device must be used in conjunction with the sliding gear transmission to enable the gear teeth to be meshed.

To overcome some of the driver effort needed to disengage the clutch, fluid couplings were introduced on the market. A fluid coupling enables the car to be brought to a stop without requiring the clutch pedal to be depressed, but it doesn't increase the torque to the rear wheels and therefore adds little to the performance of the car.

The Hydramatic Transmission has incorporated in it the fluid coupling together with a system of automatically shifted planetary gears. This provides

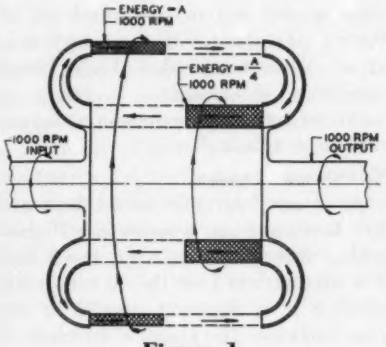


Figure 1

the desirable features of a fluid coupling and also performance for starting and accelerating. With its four forward speeds or ratios, the size of the steps between ratios can be made less than with a three speed sliding gear transmission. These changes are made at predetermined points depending on car speed and throttle position.

Ideal Transmission Explained

It now appears as if the ideal transmission must require a minimum manipulation of controls by the driver, provide good acceleration, have no noticeable transition from starting speed ratio to cruising speed and produce no appreciable loss in economy.

A torque converter satisfies these requirements better than any device known at present.

The torque converter was invented in Germany by Dr. Herrman Foettinger some 45 years ago. It was first used as a speed reducer for marine steam turbines. This was before the time of present types of high-speed reduction gear drives.

Torque converters have been used in buses for some time. Their primary feature is this application is in reducing driver fatigue and in reducing the time to make a given run. This converter is used for starting purposes only and a direct drive clutch takes over after the bus gets underway.

Torque converters were used extensively in World War II tanks because of the flexibility they provided and because they required a minimum of attention or manipulation of controls by the driver.

To explain how the Dynaflow Polyphase Torque Converter functions it is necessary to first understand how the Hydro-kinetic drives work, that is, how the fluid drive coupling works and then how a torque converter works. If the operating principle is reduced to simple comparisons with familiar mechanics, the torque converter is easy to understand.

Hydro-Kinetic Drive Simplified

The simple mechanics of a Hydro-kinetic drive begin with the mechanics of a spinning flywheel. A spinning flywheel has stored up energy and if it is stopped, it will exert a force on the mechanism stopping it. Conversely, a force must be exerted against it to get it up to speed again after it has been stopped. A fluid drive coupling with an engine driving the input member and the output member stalled, or stationary, is the direct equivalent of this principle.

As an example, let us take a fluid coupling which has the input member running at 1000 R.P.M. and the output member stalled. The input member is nothing more than a centrifugal pump, picking up oil at a small diameter and making it spin along with the vanes in this member. Centrifugal force sends the oil out radially and the oil leaves the input member at a large diameter in the form of a spinning flywheel rim, a flywheel rim made of oil. The energy in this spinning flywheel rim of oil came from the engine. As noted before, the output member is stationary, so a force will be exerted on its vanes as this spinning flywheel of oil is stopped. The force exerted will depend on the rate at which it is stopped, its mean diameter, and its weight. The fluid then flows from the large diameter of the output member to its small diameter having an inward radial movement and no spinning movement. As it leaves the small diameter of the output member, it re-enters the input member to repeat this cycle.

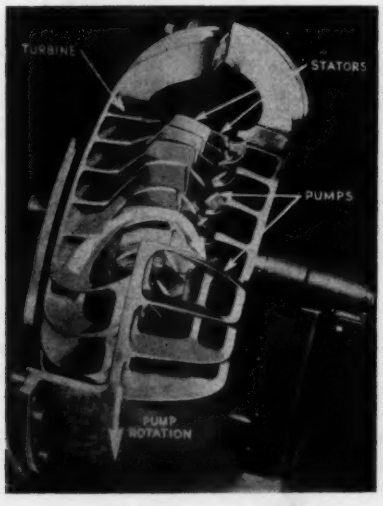
If we examine the action of a fluid drive coupling running efficiently at a higher speed, we will recognize another direct comparison with a flywheel.

Let us assume two flywheels running at 1000 R.P.M., each weighing the same but having different mean diameters. It is evident that the large diameter flywheel, while no heavier in total weight than the small one, is more of a flywheel. If the diameter of the larger flywheel is twice as great as that of the smaller flywheel, it will be four times the flywheel though no heavier in total weight. In other words, the energy contained in the larger flywheel is four times greater than that in the smaller one though both weigh the same and run at the same speed.

(Continued on Page 6)

Figure 2

Figure 3



Automatic Transmissions for Automotive Use

(*Continued from Page* 5)

Let us record another basic fact—if both of these flywheels were to have the same energy, the smaller one would have to run twice as fast as the larger one.

Let us now look at a fluid coupling with both the input member and the output member turning at 1000 R.P.M. and assign a value 'A' to the energy in the oil as it leaves the input member. (Fig. 1). The energy of this same oil as it leaves the output member will be one-fourth of 'A' and the difference, or three-fourths of 'A' will be absorbed by the output member and used as the output driving force.

Actually, the speed of the driven member must lag the speed of the drive member so that the oil will flow and enable the transfer of power from the input member to the output member via the medium of oil. The amount of lag will depend on the speed and torque being transferred.

That is how the fluid coupling works.

Element Torque Converter

Let us look at a cutaway view of the Dynaflow Torque Converter and note the five elements and the curvature of the vanes as a preliminary to the discussion which follows. (Figures 2 and 3).

5 Element Torque Converter

Now, we don't have far to go from here to a simple three element torque converter. Let us assume the circulation efficiency to be 100% and let us take the fluid drive coupling previously mentioned just as it was with the input member running at 1000 R.P.M., and the output member stalled. But let us replace the straight vanes in the output member by strongly curved vanes. We shall make the entrance of vanes so that oil will be received without splash and strongly curve them backward so that the exit oil will be actually spinning backward—it is a backward spinning fluid flywheel. The force felt by the converter output member, or turbine, is obviously much greater since it has not only absorbed the energy in stopping the spinning flywheel which entered it, but it has also reversed the direction of spinning.

An appreciable amount of energy would be required by the engine to stop this backward spinning flywheel if it was permitted to impinge directly on the vanes of the input or pump member. To take care of this condition a stationary member is interposed. This member has curved vanes also, so that it again reverses the direction of the spinning oil causing the oil to spin in the same direction as the pump it enters. The pump member picks up this oil, adds energy to it as it passes from the entrance diameter to the exit diameter and this cycle continues to repeat itself.

The oil functions in the same manner when the turbine member is permitted to move. The rate of oil flow decreases as the turbine speed approaches the pump speed and the torque multiplication decreases at the same time. This characteristic enables the engine together with the converter to supply maximum torque for starting and accelerating right where it is needed.

At cruising speeds the rate of oil flow through the openings between the vanes, or vortex flow, is small, but the rotary motion of both the pump and turbine is high. Under this condition the stationary member, or stator, would form a very serious obstruction to the flow of oil and cause the efficiency to drop as the speed increased. To prevent this from occurring the stator member, or members as in the Dynaflow, are mounted on free wheel clutches which enable them to change the direction of flow when needed and to free wheel out of the way, or along with the rotary flow of oil, when not needed. Under these conditions of cruising this design of converter actually functions in a manner similar to a fluid drive.

No Shock Losses

As in any hydraulic device there are flow losses and shock losses in a Hydrokinetic drive. To obtain no shock loss it is necessary to have the oil enter each member in a direction parallel to the vane entrance. The absolute direction of oil flow changes as the rotary speed changes in relation to the vortex flow. Therefore, to avoid any shock losses it would be necessary to provide vanes with adjustable entrance angles. This is not practical to do. We have approached this end in the Dynaflow by adding a second stator and a second pump.

Oil Direction Changes

Now let us follow the changes in direction of the oil flow through the converter and the operation of the various elements. With the pump turning,

Figure 4

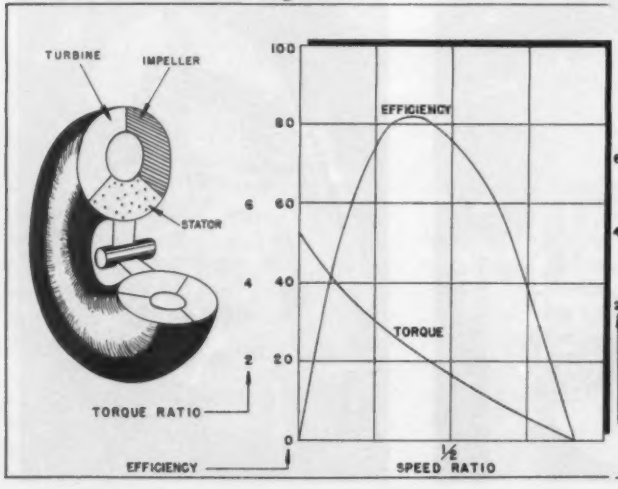
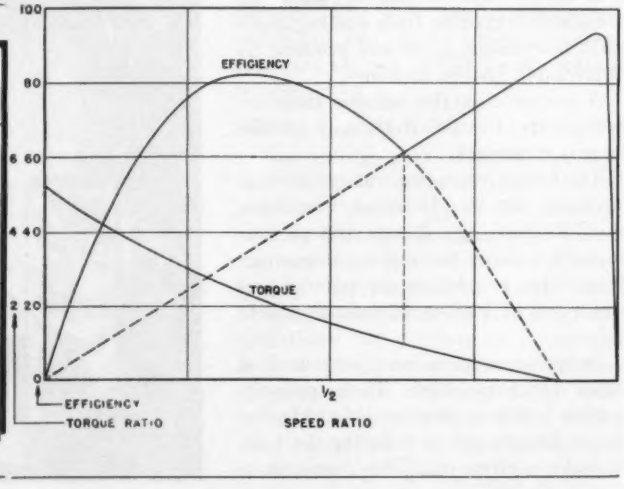


Figure 5



and the turbine stationary, the oil will leave the turbine member in a direction parallel to the exit ends of its vanes. This oil will have a backward spin to it and will enter the first stator member nearly parallel to the entrance ends of its vanes because the vanes are designed for a minimum shock loss. The first stator changes the direction of flow so that it becomes axial flow as it leaves to enter the second stator. The second stator continues to change the direction of oil flow so that the oil has a forward spin to it as it enters the pump member.

If the turbine member is now permitted to turn at approximately 700 R.P.M., the oil leaving its vanes will have a direction composed of vortex movement and turning movement. The absolute direction of flow of these two movements will be their vector sum and this total produces axial flow. This is the correct direction for entrance to the second stator without shock losses. The first stator will free wheel out of the way as the oil impinges on the back faces if its vanes.

At a turbine speed of 1000 R.P.M. a different vector sum will result, causing the first stator to spin faster. The second stator will not be redirecting the oil since the flow is practically parallel with the mean curvature of its vanes. A slightly higher speed will cause it to start free wheeling out of the way.

At 2000 R.P.M. the flow velocity is small in relation to the spinning velocity and their vector sum causes both stator members to free wheel out of the way. The Dynaflow now functions like a fluid coupling.

The pump is composed of two members. The secondary pump is mounted on a free wheel unit so that it can overrun the primary pump or can be driven by the primary pump hub through the free wheel unit. Whether it free wheels or not depends on the direction of flow of the entering oil and the speed of the pump member. With the turbine stalled, the flow from the second stator will impinge on the backs of the secondary pump vanes causing this member to overrun the primary pump. This permits the oil to enter the primary pump parallel to the entrance ends of its vanes. As the direction of oil flow from the second stator changes, when the turbine rotates, as previously noted, the secondary pump picks up the oil on its front face and assists in energizing the oil for its next trip around the circuit.

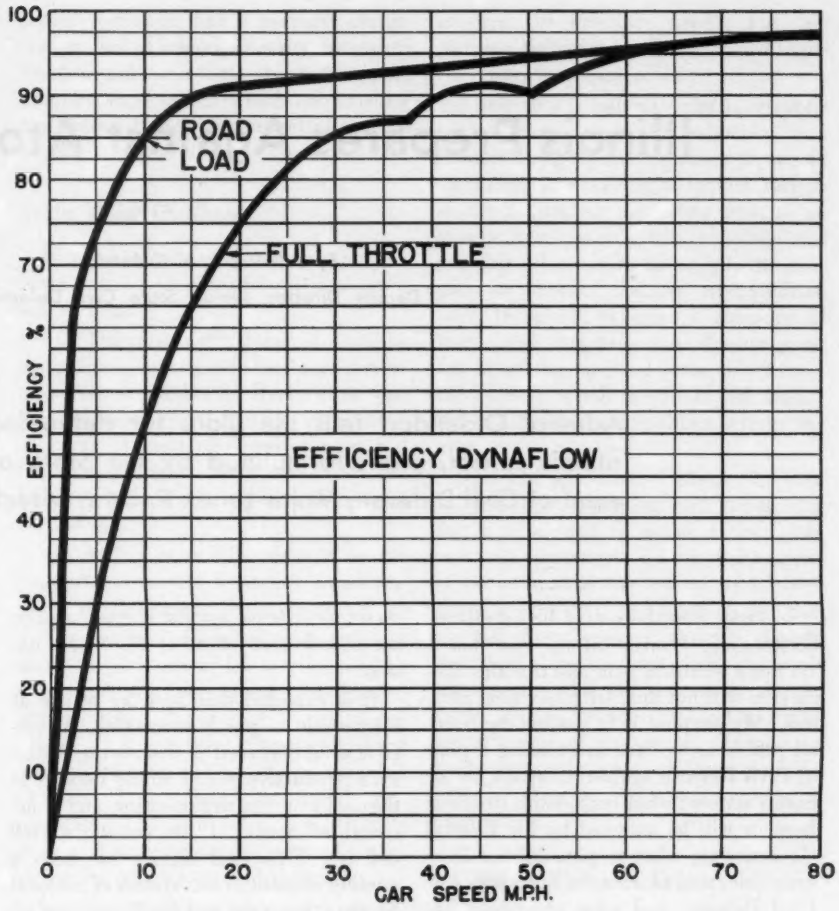


Figure 6

A three element torque converter has an efficiency curve which starts at zero, usually reaches a maximum of approximately 82%, and drops thereafter. (Fig. 4) The efficiency is zero at zero speed ratio because there is only a twisting force on the turbine and no movement, therefore the energy output is zero. The efficiency drops toward zero again after reaching its peak because the stationary stator forms such an obstruction to the flow of oil that the turbulance absorbs all the engine power and there is no output torque. This condition results when the stator is not permitted to free wheel out of the way.

If the stator is permitted to free wheel, the efficiency curve changes in direction at the so-called 'clutch point' or when the torque ratio becomes 1:1 (Fig. 5). The efficiency curve then follows the characteristics of a fluid coupling efficiency curve.

The point at which the efficiency curve reaches its peak depends upon the design of the converter. The Dynaflow converter efficiency curve really amounts to curves of three converters and one fluid coupling superimposed on each other and using only that portion of the curves which have the highest efficiency. (Fig. 6). The breaks in the curve are the stage change points, that is, when the stators start to free wheel, and the change is made automatically and smoothly. The upper curve shows the road load efficiency. Here, the transition points take place at a relatively lower car speed and the efficiency is higher as is generally characteristic of Hydro-kinetic drives.

Torque Converter Plus Hydraulic Transmission Obtain 5 Ranges

The complete Dynaflow Transmission consists of a torque converter together

(*Continued on Page* 24)

Illinois Prepares Against Atomic Bombs

By Admiral J. B. Oldendorf
Deputy Director, Illinois State Civil Defense

Admiral Oldendorf tells the plans for defending Illinois against atomic attack, plans formulated by the State of Illinois Department of Civil Defense, Major Lenox R. Lohr, Director.

In order that there may be no misunderstanding, I must inform you that I am not a technical man and that this discussion will not deal with technical matters. My purpose is to outline the overall problems we face in building a plan of Civil Defense against an attack by an enemy nation; what responsibilities have been or will be assumed by the Federal Government; what responsibilities have been delegated to us at the State Office of Civil Defense, and what procedure has been undertaken toward a basic program of civil defense throughout the State of Illinois.

Since one of our possible enemies now possesses a deliverable atomic bomb, the United States can no longer be free from the danger of a sudden devastating attack against the homeland.

The greatest deterrent to such attack is the knowledge on the part of a would-be aggressor that we have the power to destroy him by retaliatory action.

Since there can be no absolute military defense, an effective civil defense is vital to the future security of the United States because it might provide the means whereby this country, if suddenly attacked heavily and without warning, could get off the floor to fight back.

An enemy attack would presumably be aimed at the great metropolitan areas, at the industrial cities, which are the country's most critical targets.

Such an attack would be against all the people of the United States, and therefore defense against it must require the coordinated effort of the whole nation.

It is expected that such an attack at least would be partly successful. Whether it would succeed in destroying America's productive power would depend in the main on the organization and functional efficiency of the country's civil defense. This vital service has been a missing element in our system of national security, but now and until wars are effectually outlawed, civil defense must take its place along with military defense in any sound and well-rounded program.

Need Mutual, Individual Self Protection

Civil defense rests upon the principle of self-protection by the individual, extended to include mutual self-protection on the part of groups and communities. Manned largely by unpaid part-time volunteer workers, each service of civil defense will work in cooperation with the others for the common good.

As the late Russell Hopley said in a letter forwarding his excellent report to the late Secretary Forrestal:

"In the event of a future war, which might come to our shores, all of the people, all of the facilities, and all of the skills and energies of the Nation must be utilized to the fullest extent. To successfully carry out this program will require the cooperation of every man, woman, and child in this Nation. It is on such principles that civil defense must be erected and it must be with such a requirement that its organization be perfected."

Civil defense is conceived as a system which will depend largely on cooperation between critical target areas and the communities around them. To make every critical target community completely dependent upon its own resources would dislocate the national economy and jeopardize the rest of the defense effort. A system of support from surrounding areas within each State is far more realistic, because it does not call for a tremendous procurement program, or an unusual drain on men, money, and materials. Instead, it provides for the organized use of existing equipment, following the principle that location is more important than quantity. The strategy is to organize for this type of support on a Nation-wide basis.

Within target areas considered critical the same principle will apply, with individual and family self-protection being supplemented by the organized civil-defense services in all parts of the community. Civil defense teams and equipment, strategically dispersed in outlying parts of a city, will move immediately into stricken areas, and help the residents combat the effects of the attack. This strategy is for use in civil defense operations after attack.

Another strategy affecting designated target areas throughout the Nation re-

lies on combined and related programs in pre-attack action to reduce materially the magnitude of disaster.

With early warning of possible attack, partial evacuation from critical target areas may be considered.

With an effective air raid warning service, the population can take cover in preconstructed personnel shelters until the danger has passed.

These advance actions, combined with prompt and effective post-attack actions, would reduce casualties to a small percentage of what they otherwise would be.

The responsibility of the Federal Government is to establish a national civil defense plan with accompanying policy, and to issue informational and educational material about both. The Federal Government will provide courses and facilities for schooling and training, provide coordination of interstate operations, furnish some of the essential equipment, and advise the States concerning the establishment of stockpiles of medical and other supplies needed in time of disaster. The Federal Government will deal directly with the State, i.e., with the Governor, or if he so delegates, with the State civil defense director.

State Supervises C. D. Plans

The responsibility of the State government is to provide leadership and supervision in all planning for civil defense, and direction of supporting operation in an emergency. The State is the key operating unit. It is the "field army" of civil defense. Its counties or cities are its "divisions." When one or more divisions are hard hit, the remaining ones are sent in for support—over and above the capabilities of local self-help and mutual aid.

In addition, the State will participate in interstate planning and operations in collaboration with the Federal Government, provide supervision, instructors, and facilities for appropriate training programs, and accept and allocate such Federal funds, supplies, or equipment as may be provided for the counties, cities, and towns.

No city or metropolitan area can be expected to provide completely for its own self-protection or recovery after attack. In fact, such provisions are unnecessary and are less practicable in actual operation than a properly organized system of intercommunity assistance (mutual aid) and State-directed support (mobile support) in which the existing resources of the State mobilize for the common protection.

State Plan Outlined

In view of these considerations, the State-supervised plan for civil defense will aim to:

(1) Organize critical target areas to meet emergency conditions anticipated under an atomic bomb attack. This type of organization will include all existing elements of local civil government and facilities, protective services not included in peace-time civil organizations, and mutual aid.

(2) Organize mobile support in the support areas, which are of equal importance to critical target areas.

The services described (except such static services as warden service) will be organized on a basis of specialized units, with provision for a high degree of mobility. To be effective, these specialized units must have (1) ability to assemble rapidly, (2) provision for rapid transportation, (3) provision for effective means of communication, and (4) provision for operational self-sufficiency.

In order to achieve a balanced organization of the various services, the State Office of Civil Defense must supervise the organization and development of all such units in support areas.

Each community in the State will be expected to study and analyze its individual problems so that its civil defense plans and organization will conform to its specific needs in case of disaster. The State Office of Civil Defense has the responsibility of making sure that each city and other areas within the State actually has such plans developed and the responsibility of bringing all of the resources of the State to the aid of any stricken community.

Divide Illinois Into 4 Areas

It is of course not possible to say that this community *will* be bombed and that some other community will *not* be bombed. But there are reasonable assumptions to guide us in setting up an over-all State Defense program, with plans for different communities varying to meet the indicated needs. For this purpose the State has been divided logisticly into four categories.

I believe it is fully obvious to everyone that Chicago and the suburban and industrial areas surrounding it would constitute one of the principal targets in the nation for an enemy attack—an atomic bomb attack, with sabotage and possibly other action to cripple the area and its people. Chicago metropolitan area, therefore, becomes a category of itself, and this area has already gone far in setting up its defense program—the core of which is mutual aid among the scores of municipalities within the area.

The Chicago Civil Defense Committee has been planning and organizing for months, and is doing a good job, and will continue to do so. It has gone so far as to stage theoretical atom bomb drops on the city, and has followed that up with an entire week of day and night meetings of review, criticism, and study for changes and adjustments in the defense plans. Leaders and other representatives of all groups and agencies cooperating in the area's defense planning attended these meetings and round-table discussions.

11 Other Critical Areas

Now as to the rest of the State—all of the State outside the Chicago area. Here the category that is receiving first attention is that of seven critical target areas within the state, and four critical target areas in other states but immediately outside Illinois boundaries, in the defense of which Illinois will be expected to collaborate with the bordering states. These critical target areas are cities, or in some instances, groups of more or less contiguous cities and towns, which have been designated by the National Security Resources Board as the most likely in this region, aside from Chicago, to be chosen by an enemy for atom bomb and related attacks—chosen because they are industrial centers highly important to the nation's wartime production.

The obvious need for these areas is a well-organized, well-equipped, and well-trained system of mutual aid, backed by mobile support from other areas within reach. It is recognized that no hard and fast rule can be set up for mapping

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To Protect You

A WSE Program on Civil Defense
Presented October 2, 1950

1. Chicago Civil Defense Committee

By BALDWIN B. SMITH
Civil Defense Deputy Coordinator

The present Civil Defense Committee of the City of Chicago is an outgrowth of the Chicago Disaster Committee which Mayor Kennelly directed be which Mayor Kennelly directed to be formed shortly after he assumed his office as Mayor of the City. This Disaster Committee was formed almost entirely from various agencies and departments of the city government and was designed to effectively combat forms of disaster which might occur in the City of Chicago.

Chicago Selected As Test City

About six months ago Chicago was selected as one of the three cities of the Country to be made the subject of a series of Civil Defense test exercises which were designed to serve as a basis for the future development of a national Civil Defense program. Accordingly, the Chicago Disaster Committee was converted into the Civil Defense Committee and was expanded to include other agencies not a part of city government, but which would be required in the well rounded development of a complete Civil Defense plan. These agencies included principally communications, transportation, plant protection, air raid warning service and a foundation for a block warden service. During the course of the past six months, the organization has undergone a series of revisions, each designed to further improve and strengthen the operation of the organization as a whole. At the present time, Mayor Kennelly heads the organization as the top-ranking elected public official of the City, responsible for the maintenance of law and order and responsible for the welfare of the citizens. Chief Fire Marshal Mullaney has been appointed Director, and serves as the Operating Head, with Mr. Victor C. P. Dreiske as Co-Director.

The activities of the Civil Defense Committee are divided into five principal divisions, each headed by a Deputy Director. Mr. John Mortimer, Assistant Corporation Counsel of the City of Chicago, heads the Headquarters and Administration Division. Police Commissioner J. C. Prendergast, heads the Division of Public Safety. Dr. Herman N. Bundeson, is Co-Deputy, who heads the combined divisions of Medical Services and Welfare. Mr. L. M. Johnson, heads the Public Works division and Mr. Harry F. Chaddick is the Deputy Director in charge of Public Services. It is considered probable that further revisions of the organization may evolve as a result of the recent Exercise and we believe that in the near future, based upon a close study of the Exercise we have just completed, we will develop a permanently organized Civil Defense Corps of the City of Chicago.

Now, as to the present status of Chicago's Civil Defense plans: We have just completed the initial phase of our current Civil Defense planning. Each division and subdivision of the entire Civil Defense organization, during the past several weeks, have completed an initial draft of their basic plans. These plans were co-ordinated with other services and divisions at a series of co-ordination meetings and were then used as a basis for solving an imaginary problem which involved an atomic attack upon Chicago. Much has been accomplished in laying the foundation for future development of a well organized and well coordinated plan for the defense of Chicago against such an attack. The basic requirement of the problem recently presented to us was to determine the maximum we could accomplish with what we now have to work with. In other words, the problem was to determine "the best you can do with what you have." The initial approach to the preparation of a plan of operation therefore required an enormous amount of basic research compiling, and inventory of our presently available resources, equipment and manpower. This compilation and inventory has now largely been completed and we are in a much better position to know exactly what we do have to work with.

Mission: Passive Defense, Minimize Loss

It may be interesting for you to consider that there are many aspects of planning for an operation of this kind which closely parallel the type of military planning which would be required for a large scale defensive operation. In the development of military plans, there must first of all be an assigned mission which outlines certain objectives to be accomplished. Our mission in this instance could be defined somewhat as follows: "To plan for conducting the

best possible passive defense operation with the objective of minimizing to the greatest possible extent, the loss of life and destruction of property which might result from a hostile atomic attack."

A military commander of a planning officer, in the development of plans, based upon such a mission as that, would, very early in his planning operation, want to know the troops or troop units he would have available. In other words, he would compile a Troop List, listing units, their equipment, their state of training, their location and their availability in terms of time or distance from the scene of operation. This feature of the planning has been largely accomplished here in our basic inventory of manpower, equipment and facilities.

A military commander would also want to insure an adequate communications net to provide for continuous information flowing from the front toward the rear, in order that he might be kept informed of progress of the action and to insure the certain transmission of his orders or directives in order to make it possible to quickly move reserves to the critical points of attack. We believe that we have accomplished this. Our communications plans provide for a diversity of communications methods and appear to be adequate to meet the situation.

2-Way Road Net Important

Another important consideration would be an adequate road net to facilitate prompt movement of badly needed units to the critical points. In a defensive operation a two-way road net is more urgently required than in the offense. When we consider an offensive situation, we imagine reinforcements and supplies coming up from the rear, and the entire front line continuously moving forward with casualties being picked up by medical units following in the rear as the action progresses. In a static defensive operation, the procedure must be different. Here we must keep reinforcements and supplies moving forward, but we must also have a well organized two-way road net which will permit the prompt removal of casualties from the forward areas. This is important not only in minimizing the loss of life among the seriously injured casualties but also for morale purposes among the front-line workers.

There is no question in this situation but that our road net is adequate. The prime question is how best can we use this road net? There are two major considerations involved in this question.

First, the development of a traffic plan and second, adequate provision for traffic control and enforcement.

The mission was to prepare a traffic plan which would insure the free and uninterrupted movement of Civil Defense emergency vehicles and equipment both toward and away from a major damaged area. It was assumed that this movement might continue for some hours, possibly 24 or 48 or even longer and would undoubtedly include the movement of numbers of such vehicles and equipment into Chicago from outlying areas as far as 50 to 100 miles away. It would also include movement of large numbers of casualties out of Chicago into the outlying areas.

The Traffic Planning Committee was organized on August 9, 1950.

This Committee is concerned only with traffic planning on streets and highways; all other traffic planning such as air, rail and waterway will be handled by the Transportation Committee.

Sub-Committees

Three subcommittees have been organized and are doing the work assigned to them.

1. PERSONNEL:

   This subcommittee will assign personnel to the various headquarters and will compile lists of names, addresses, phone numbers and assignments. It will also arrange for needed maps, material, equipment and headquarters space.

2. CO-ORDINATION:

   This subcommittee will co-ordinate the work of the Traffic Planning Committee with the other committees of the Civil Defense Organization. It will also provide liaison with the various groups working on the committee and especially with the enforcement groups. It will be responsible for communications, observations and reports that will be required by the Traffic Planning Committee.

3. TRAFFIC REGULATION:

   This subcommittee is to work out Emergency and Primary Routes, block systems, method of regulation and control, and establish further traffic regulation as required. This would include a traffic plan for any designated local area which might be affected. It will also include study of possible conditions which may arise and plans to meet these conditions.

Traffic Plan

The subcommittee on Traffic regulation evolved the following traffic plan on September 8, 1950.

In preparing the initial traffic plan, the following assumptions were made:

a. The success of a traffic plan will largely depend upon its simplicity. Therefore, any plan which involves intricate cross movement or radical changes in the normal traffic pattern must be avoided insofar as possible.
b. Traffic control and planning facilities must be established in advance of an alert.
c. The execution of the plan will be a responsibility of police enforcement agencies augmented by military and civilian aides while the Traffic Planning Committee serves in an advisory or staff planning capacity.

The Roadnet

There is established a roadnet consisting of the three following systems:

1. Emergency Routes made up of principal streets about 3 miles apart to be used only by essential vehicles.
2. Suburban Emergency Routes to allow access of essential vehicles from suburban areas.
3. Primary Routes made up of section line streets, important diagonal streets and other main highways which are to be used by essential vehicles and by other vehicles.

The attached maps show the above routes.

Priority of Vehicles

Only essential vehicles will be permitted on the Emergency Routes.

An essential vehicle is any vehicle which can clearly be recognized by its function or markings as being essential to the emergency, such as fire, police, ambulance, communication or repair vehicles and any vehicle which has been furnished the official vehicle identification of the Civil Defense Organization.

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To Protect You

2. A Bomb Problem Solved By Traffic Engineers

By VIRGIL GUNLOCK, (WSE)
Chairman, Traffic Planning Committee

The yellow alert was received at approximately 5:30 A.M. at home.

Next the Chairman of Subcommittee on Personnel was called and instructed to alert the first shift of the Traffic Planning Committee which was to go to the four headquarters.

Proceeding immediately to Central Traffic Planning Headquarters at 20 N. Wacker Drive the maps were brought out and communications tested. Reported to Control Center that Traffic Committee was ready for operation. The Traffic Police put the Traffic Plan in effect immediately upon receiving the police alert. On the all clear signal the Civilian Traffic Control Guards took their post assignments. At this time all intersection on the Emergency Routes were under police control. All the intersections of Primary Routes were also under police control.

Under this system of permitting only essential vehicles on Emergency Routes all other traffic was substantially confined within 32 major blockade areas because it could only cross Emergency Routes under police supervision at Primary Route intersections.

On receipt of information as to location of north and south bomb bursts these locations were plotted on maps.

North Bomb Burst

It was found that parts of 6 blockade areas were included in the major damage area of the north bomb burst.

Starting on the north and giving the boundaries clockwise these areas were:

1. A 11; A 2; A 10; A 1.
2. A 11; A 3; A 10; A 2.
3. A 10; A 3; A 9; A 2.
4. A 10; A 2; A 17.
5. A 9; A 1; A 17.
6. A 17; A 9; A 2.

Because Emergency routes A 2; A 10; and A 17 pass through the major damage area it was decided to form one blockade area out of the six above areas. This re-formed area was bounded by Emergency Routes A 11; A 3; A 9 and A 1.

Through emergency traffic on the routes which run through the major damage area, A 2; A 10 and A 17, must be re-routed around the periphery of the new blockade area using routes A 11; A 3; A 9 and A 1.

South Bomb Burst

Plotting information on the south bomb burst disclosed that sufficient Emergency Routes had not been designated to enclose this area. Consequently A 1 was extended south to 127th Street which became Emergency Route A 4 from A 1 to A 3. The damaged area occupied parts of four automatic blockade areas. These were:

1. A 6; A 3; A 5; A 2.
2. A 5; A 3; A 4; A 2.
3. A 5; A 2; A 4; A 1.
4. A 6; A 2; A 5; A 1.

Two Emergency Routes, A 5 and A 2, pass through the major damage area.

These four areas were regrouped into a new blockade area bounded by A 6; A 3; A 4 and A 1.

Through emergency traffic on the routes which run through the major damage area (A 2 and A 5) was rerouted around the periphery of the new blockade area using routes A 6; A 3; A 4 and A 1.

The new blockade area is shown in red on the attached map.

The above information relative to regrouping and rerouting was dispatched to the Central Control Center.

Ground Burst

The major damage area of the ground burst occupied parts of six blockade areas. These were:

1. A 9; A 17; A 8; A 2.
2. A 8; A 3; A 16; A 7; A 2.
3. A 7; A 16; A 2.
4. A 16; A 7; A 3; A 6; A 2.
5. A 7; A 2; A 16; A 1.
6. A 8; A 2; A 7; A 1.

Because of the very irregular shape of these areas it was decided to consolidate them into one area bounded by A 9; A 3; A 6 and A 1.

Emergency Routes A 8; A 7; A 16 and A 2 ran through the major damage area and were re-routed around the periphery of the new blockade area.

These boundaries and detours reported to the Central Control Center.

Blockade Areas

A study of the two air burst areas was started to try to reduce the size of the new blockade areas and provide Emergency Routes closer to the major damage area.

The need for reducing these areas was intensified after the ground burst. It can be seen on the attached map that the blockade areas for the three bursts form a contiguous area about six miles wide and twenty two and a half miles long. This occupied more than half of the area of the city.

After sufficient reports from the aerial and ground reconnaissance and radiological monitoring services indicated that this could be done, the blockade areas were reduced to the following areas:

North Burst—A 11; W 16; N 24; A 1.

South Burst—A 87; A 3; A 4; W 32.

Ground Burst—N 8; A 3; S 39;

W 32.

The Emergency Routes were re-routed around the new peripheries.

It will be noted here that the blockaded areas are now partially bounded by *Primary Routes* instead of all *Emergency Routes* as was the case in the first step. To do this it was necessary to police all the intersections along these Primary Routes which formed these boundaries.

The reduced blockade areas are shown in green on the attached map.

Auxiliary Emergency Routes

It was found after the three bursts that only one north-south Emergency Route (A 2) was put out of service. While this was detoured around the damaged areas the effectiveness of this route was practically lost because detours were required at all three bomb locations. This threw a heavy load on Emergency Route A 3 which was the only remaining north-south Emergency Route east of the bomb bursts.

Four east-west Emergency Routes (A 10; A 8; A 7 and A 5) were put out of service leaving only A 11; A 9 and A 6 of the original east-west Emergency Routes. This left A 9 and A 6 to carry all east-west emergency traffic south of the north air burst. These routes were overloaded and caused many critical intersections—one very critical point being the intersection of A 3 and A 6 at 63rd and State Streets.

Because of this it was necessary to designate auxiliary Emergency Routes as follows:

North-south

Sheridan-Foster-Outer Drive-Stony Island.

East-west

N 8; S 55; and A 4 (127th & 130th Sts.)

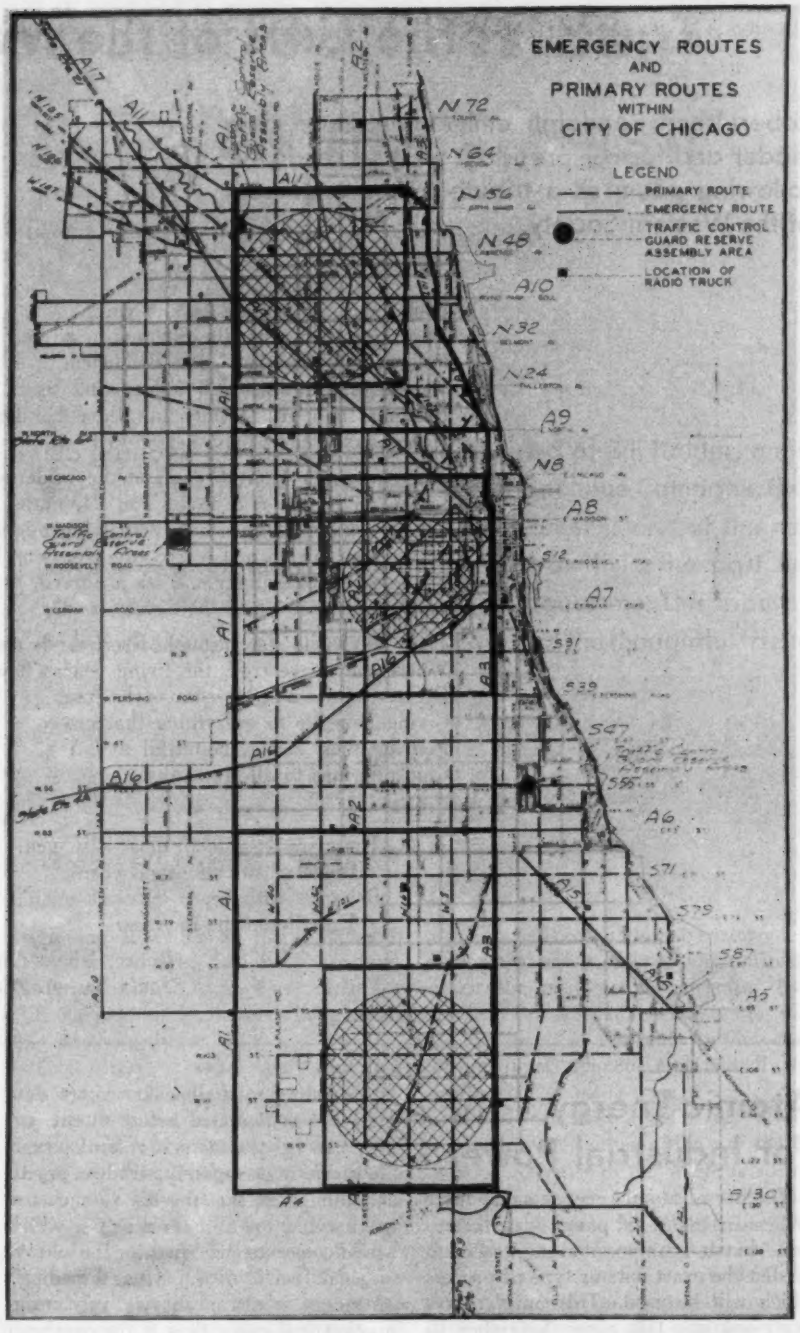
As the critical intersections were spotted detours were worked out to try to ease the jams that developed.

Suburban Emergency Routes

Suburban Emergency Route U. S. 41 connecting with A 1 was not cut off by the bomb burst but was congested gested badly due to A 1 being the western limit of the blockade area for the north air burst.

Suburban Emergency Route Ill. 21 connecting with A 17 ran into the west blockade limit at A 1. This caused so much congestion that A 17 was detoured over W 56 south to N 8 and east on N 8.

(*Continued on Page* 27)



Map of Chicago keyed for the emergency and primary routes and the bomb bursts. It can be used for parts 1 and 2 of "To Protect You."

"The Gifts of the Magi"

Robert Isham Randolph, eminent engineer, civic leader and former president of WSE sends the following poem as a tribute to the engineers of the Western Society.

Even today, as in those days of yore,
Wise men with gifts, the Saviour to adore,
Followed the star that led to Bethlehem,
Wise men with gifts still follow after them,
Bringing their gifts to men for whom He died,
Humanity — the Christ personified.

They follow the star throughout the wilderness.
Lo, in their path rise homes and happiness,
Rivers are stayed and their destroying might
Serves men to spin and weave and give them light;
Fetters of earth and sky and sea are freed,
And pliant forces serve their every need.

They follow the star through desert sands and, lo,
Where they have trod, the living waters flow;
Deserts rejoice and blossom as the rose,
Giving new life to everything that grows;
Pouring their riches, bountiful and free,
Glad offerings to all Humanity.

* * *

These are the sons of those wise men,
Breed of two thousand years;
Bringing with peace on earth again,
The gifts of the Engineers.

Robert Isham Randolph 12/21
Santa Barbara, California

Atomic Energy For Industrial Power

The use of atomic energy as a source of heat or industrial power is certain to come but it is impossible at present to predict the exact date or type of process which will be used. This opinion was expressed in a talk given November 13 before members of the Illinois Chapter, American Society of Heating and Ventilating Engineers, by Dr. Stuart McLain, a senior chemical engineer at the Argonne National laboratory and chairman of the steering committee for the materials testing reactor, one of the Atomic Energy Commission's post-war nuclear reactors now under construction in Idaho.

According to the speaker, more data must be accumulated before atomic energy can be used as a source of power. However, it is apparent, from a practical standpoint, that the key to such use in carrying on a chain reaction which would generate new fuel as the old or original fuel is used. This "breeding" of energy would mean relatively insignificant fuel costs, though the overhead or investment costs would still be extremely high. While no breeding has yet been done, a breeder pile is now under construction.

In answer to the question as to why power plants are not being constructed now, Dr. McLain pointed out that security is a most important reason. He also said that most of the engineers and scientists connected with the atomic energy commission are now working on weapons or problems dealing with the use of nuclear energy in war. He stressed the fact that during the Manhattan project a great many top engineers helped out, but most of these have returned to industry so that the government now needs the services of engineers experienced in the field of nuclear energy. The third reason given was the need for additional research and the development of cheaper plants. Based on present experience, Dr. McLain believes that the cost of power from atomic energy would be considerably more than the cost from coal. Since the investment cost represents a large part of the power cost, cheaper plants must be developed. To date no real project has been undertaken for this purpose.

Bill Kahler Elected President of Illinois Bell

No group of people could be more proud of Bill Kahler, on his election to President of the Illinois Bell Telephone Company, than are his fellow members of WSE. Bill Kahler is one of the men largely responsible for WSE's rapid growth in the past few years, and for its commodious new headquarters. This tribute is to Bill, the engineer, the business man, and the thoughtful friend.

Bill Kahler, as he is known by his close friends and fellow WSE members, is one of the youngest presidents in the history of the Bell Telephone System. After his graduation from the University of Missouri in 1922 with a B.S. degree in Mechanical Engineering, he immediately joined the Bell System as an assistant engineer in the Bell Telephone Laboratories in New York.

He rose rapidly, as chief engineer, Chicago Area, general manager of Illinois Bell's State Area, assistant vice-president of Illinois Bell and finally vice-president in charge of operations.

But his rapid rise was due neither to accident nor privilege, but to the fact that he possessed and used his remarkable combination of ability and character, plus that never failing implement of success, hard work. Those who know Bill, know that there never was a harder working man, rarely taking the customary vacation and generally working long and diligently day after day.

Bill was once a farmboy in Missouri and he takes great pride in this rural beginning. It is often said of people with farm backgrounds, that they have their roots in the soil. A more apt cliche for Bill Kahler would be that he has his feet on the ground.

One rarely, if ever, hears Bill talk about himself. Bill would never dwell on the fact the he was chief of the bureau of construction of the WPB during World War II, or that he is active in many civic affairs such as his directorship of the Crerar Library and as member of the Board of Trustees of I.I.T. Rather, when you talk with Bill Kahler you experience the feeling of his sincere interest in your own problems. He is warmth and cordiality at their peaks, a superlative combination of what success stems from. That is part of the reasons Bill has succeeded.

No doubt his success has been enhanced in great measure by his constant awareness of his employer's interests and the welfare of his employees. Not one customer complaint is too trivial for Bill Kahler. On many occasions he has had complaints transferred to his own phone, so that he might directly learn the customer's viewpoint. Ever modest, Bill feels that whatever he may be or become is due solely to the efforts of his loyal, efficient and friendly co-workers.

While succeeding, Bill has always stopped to help others. Many of the expanded activities of the Western Society of Engineers are a direct result of an unbelievable amount of time he spent in addition to his regular duties, both as a member and as a president. He brought a wide new horizon to WSE, full of challenges and benefits.

All of the members of the Western Society of Engineers rejoice that one so devoted to their organization has achieved such a high position in the business world. Mr. Kahler is one of the vanguard of a movement wherein succeeding generations will see the engineer active in management. Congratulations to Bill Kahler and many wishes for his continued success.

You'll find a holiday haven at WSE Quarters

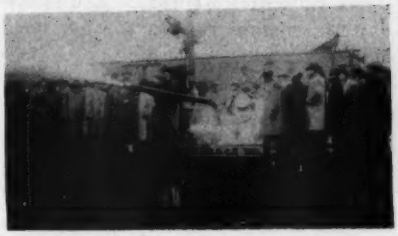
Whether you want a breather after shopping in the windy city.....or a tasty meal without tagging onto the end of a mile long line

You'll Find It Waiting at the Lounge and Dining Room

84 E. Randolph RA 6-1736

- Relax in the lounge
- Meet your friends
- Lunch without crowds
- Dine with the family
- Use the lounge and dining room for holiday parties
- Luncheon- 11 a.m.-2 p.m.
- Dinner- 5:30 p.m.-8 p.m.

W.S.E. Members "Go Railroading"



Counter clockwise starting at 12 o'clock

1. **Ladies follow tour maps, look pretty while engineers study retarder yards.**
2. **Guests determine if engine is steam or diesel.**
3. **Car #2 had interesting mile-by-mile talk by Division Engineer, Fred Hess.**
4. **Baggage car after tour of icing plant almost runs out of sandwiches, coffee and milk.**
5. **Excursioners feel a slight spray from the hose as perishable food stuffs are iced.**
6. **Engineers take truck trip, see how Chicago handles perishable fruits, vegetables.**
7. **Coaches were filled with lively members and guests. Only a few brave ones ventured onto gondolas.**
8. **WSE engineers really start young.**

In the season's first cold wave with sleet and snow effects, the WSE excursion party boarded a special train of 3 passenger cars, baggage food car and 2 gondola cars for a fifty mile tour. The heated coaches, the informal but chilly gondola cars, the warm friendship and many views of the industrial Chicago areas gave a thrill to 150 WSE members, families and guests.

At Blue Island the engineers had a truck trip to see the icing of vegetables and the facilities for handling perishable foodstuffs through Chicago.

The hump yards, where the greatest rail center of the world classifies freight cars, were in operation.

Many members like brave Mr. Merrill, Dot Merrill, and Mr. Humiston enjoyed the scenery and arctic air from the gondolas.

F. W. Hess, WSE and a division engineer of Indiana Harbor Belt and L. W. Ollman of N.Y.C. did much planning to provide for the safety and comfort of the sight seeing engineers, many wives, friends, and youngsters who enjoyed the trip.

Quite a few people met each other for friendly chats as the train proceeded around Chicago. At 3:00 p.m. the excursion arrived in LaSalle St. station and ended this interesting day with the railroads.

As the group disbanded, plans were underway for the next excursion.

SEE YOU AT WSE'S NEXT EXCURSION TO WNBQ

Engineers To Celebrate In 1952

Eleven national technical societies and one from Canada have already taken formal action to participate in the international convocation which will celebrate one hundred years of engineering as an organized profession in the United States. This convocation, organized under Centennial of Engineering, 1952, Inc., is designed to "Provide an opportunity for all engineers to gather to exchange ideas and information of value to one another with no one group taking a place of special prominence."

At a meeting on October 12, 1950, the incorporators of Centennial of Engineering authorized President Lenox R. Lohr to extend invitations to an additional sixty technical societies in this country, and to appropriate societies of international scope, or of national scope in other countries. The international societies will be invited to hold their annual meetings in Chicago during the Centennial Convocation from September 3 to 13, 1952. Where it is not feasible for the societies of other countries to hold meetings in this country, it is hoped that they will send representatives to the convocation.

Before the year 1800, the only engineers were military engineers. For centuries they were the designers of fortifications, such as the noted Frenchman, Vauban, and were the keepers of the king's engines: catapults, battering rams and scaling towers. Elements of the civilian economy, such as bridges, roads, viaducts, mines and buildings, were built largely by artisans with empirical designs developed from the experiences of their predecessors. The small industries of the day—cotton and flour mills, stonecutters and shoemakers—were largely family concerns utilizing limited help from their neighbors and not requiring the service of engineers.

Up to this time the United States had lacked even military engineers, and during the Revolutionary War had utilized Europeans. In the year 1802, West Point was founded, not primarily as a training school for officers, but to develop military engineers, and while its basic function has changed, it has remained under the supervision of the Corps of Engineers ever since.

With the march of progress it was realized that engineering had a scientific and economic basis, so the Corps of Engineers was called upon to build such things as the Baltimore and Ohio Railroad. Even as late as the 50's, the lack of American engineers made necessary the use of British engineers in designing the Northwestern Railroad. And to this day the engines run on the left hand side of the track—according to the British practice.

With the introduction of steam power and the rapid economic expansion of the country, large manufacturing plants and major engineering works were developed and the need of civilian engineers was realized.

The first engineering school in the United States was Rensselaer Polytechnic Institute, which was established at Troy, New York, in 1824, and a new profession came into being. In the year 1852 the first national engineering society, the American Society of Civil Engineers, was formed. The connotation of civil engineer was quite different from that accepted today, being used only to differentiate them from the specialized work of the military engineer. It included all branches of the engineering profession as well as architects. As the industrial revolution brought expansion of the small home industries to the giant concerns of today and as the amount of engineering knowledge increased, specialization became necessary. Various groups of engineers such as mining, mechanical, electrical and chemical formed societies of their own. But they all had their inception in the first national society of civilian engineers in 1852.

America today enjoys the highest standard of living of any nation in the world. With 6% of the world's population it has:

70% of the world's automobiles,
50% of the world's telephones,
48% of the radios, and we produce
32% of the world's manufactured goods.

Without the engineer with his scientific background, mass production and mass distribution as we know it today would have been impossible. In general he has been the unseen force behind management, operating under the aegis of the free enterprise system that has made the United States the most powerful and prosperous nation in the world.

As the one hundred years have passed since the founding of the American Society of Civil Engineers, and as the branches of the engineering profession have grown more specialized, engineers have become less generally informed about the activity of the profession at large. The Centennial Convocation will give the engineers of the country an opportunity to attend meetings and hear technical papers of the other branches of engineering, and to obtain pertinent information on the developments available to them from specialties outside their own fields.

(*Continued on Page* 19)

Dr. Egloff Tours West

Dr. Gustav Egloff, 1949-50 president of WSE, spread a wealth of information about the oil industry on his recent west coast trip.

Dr. Egloff attended the American Petroleum Institute's annual meeting in Los Angeles on November 13 to 16. He addressed the Lubrication Session, Division of Marketing with the talk, "Strategic Oil Supplies."

He also was guest speaker at a luncheon of the Town Hall of Los Angeles, an organization of business and professional men. The subject was "Oil Supplies in a World Emergency."

"World Outlook for Petroleum" was the title of Dr. Egloff's address at the Los Angeles Breakfast Club. The program was broadcast locally over Station KFWB.

Hydraulic Torque Converters, ASME Discussion

ASME Junior group will meet Tuesday, December 12 at 8 p.m. to hear Professor Wilhelm Spannhake, talk on "Hydraulic Torque Converters and Hydraulic Couplings." Professor Spannhake is Senior Research Scientist in Applied Mechanics Research Department, Armour Research Foundation. He is also Adjunct Professor, School of Mechanics, I.I.T. The meeting will take place in the Chemistry Building Auditorium of I.I.T. Dinner will be served at 6:45 p.m. in the Student Union, cost of dinner will be $2.00.

The following Friday, December 15, the Woman's Auxiliary will gather at Carson's North Tea Room for luncheon and Book Review. Mrs. Paul A. Swaim will review several current best sellers including the Gilbreth's "Belles on Their Toes." The ladies will meet at 1 p.m., the price, $2.

"The Chicago Ordnance District and Production for Defense" is the tentative subject for the Management sponsored meeting, Tuesday, December 19. Lt. Col. William H. Crown, Jr., will be the speaker. Lt. Col. Crown is Deputy Chief, Chicago Ordnance District, U. S. Army. The meeting will take place at WSE headquarters, at 7:45 p.m. The ASME Dinner Table will assemble at 6:15.

Make all reservations by calling FI 6-2990.

Engineers to Celebrate in 1952

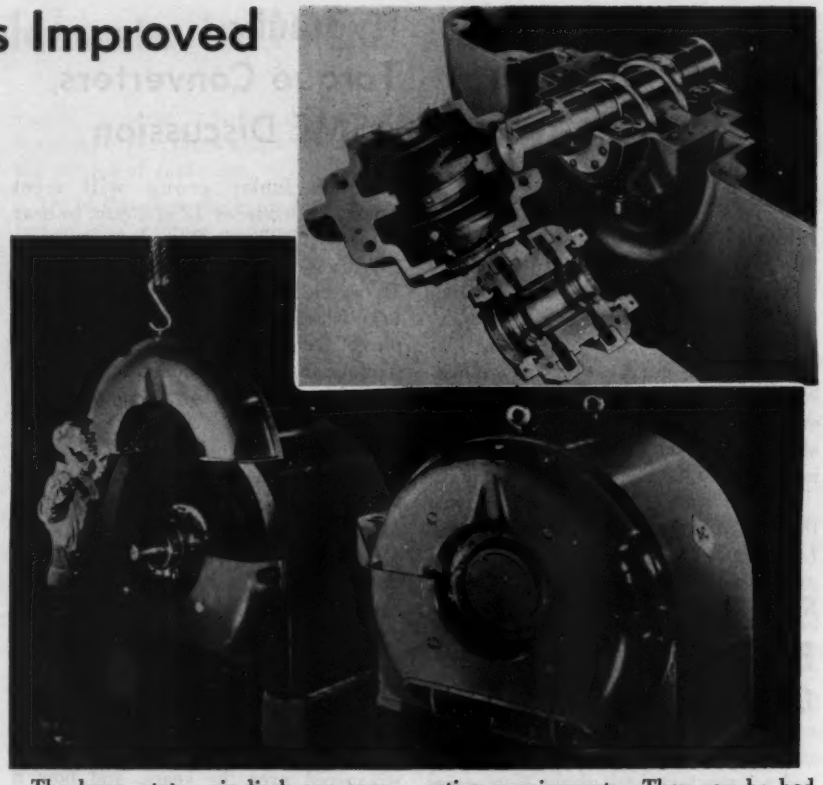
(*Continued from Page* 18)

An important part of the Centennial of Engineering celebration will be an Exposition during the months of July, August and September in 1952. The incorporators of the Centennial of Engineering have stated "The purpose of the Centennial Exposition should be to tell the story of engineering and industry to the general public." The story of engineering and industry is one story. To take either element without the other would be almost impossible. For this reason it is essential to the engineer that our industrial system be preserved on the same freely competitive basis on which it has been built.

This story will be told in many ways at the Exposition which will be held at the Chicago Museum of Science and Industry. First in public appeal will be a stage production in the thousand-seat main auditorium of the Museum. This show will be a dramatic human interest pageant about America, how it grew and prospered over the years, and how it can continue to grow. The essential role of the engineer and his industrial machine will be woven into the pageant just as it was woven into our daily lives.

A permanent engineering exhibit will be built in the Museum where it may be open to visitors in July of 1952, and during the years that follow. This exhibit, occupying over eight thousand square feet of floor space, will utilize dioramas, models, and full size equipment to show the evolution of engineering and of the engineer over the last hundred years. There will be examples of every field of engineering arranged to show how the products of dozens of different specialties come together to make one complete complex machine.

Induction Motors Improved



Allis-Chalmers' standard line of large, bracket-bearing, squirrel-cage induction motors of four and more poles has been re-designed to provide more protection and greater accessibility.

Eye appeal and functional construction have been combined in the design of these motors to give them a thoroughly modern appearance.

Capsule-type sleeve bearings are standard. The split, cast-iron bearing capsule or housing has a machined flange for bolting to the bearing bracket. This permits removal of the upper half of the bracket for inspection or cleaning without exposing the inside of the bearing. Similarly, the ample air-discharge openings in the side of the stator yoke, protected by removable louvers, facilitate vacuum cleaning or blowing out the air passages behind the stator core.

Since the only openings in the bearing brackets are in the air intakes near the bottom, the brackets afford effective protection for the ends of the motor. This construction, plus the use of louvered panels in the stator air-discharge openings, makes the standard design drip-proof. Splash-proof motors with internal baffling of air passages are also available.

The large, stator air-discharge openings also facilitate installation by providing adequate headroom for drilling and doweling the maching to its foundation. In addition, the foundation bolts and doweling are out of sight behind the discharge louvers. Tapped, plug-protected holes in the brackets permit easy checking of the air gap.

Ventilating air intake and discharge openings and internal passages in both the bearing brackets and the stator are liberally proportioned to provide uniform ventilation for freedom from hot spots and moderate air velocities for quiet operation.

The motors are available with special electrical modifications to suit application requirements. They can be had with anti-friction bearings whenever the speed and application are suitable.

Bracket-bearing, squirrel-cage induction motor construction in this Allis-Chalmers line is standard for ratings up to 1 hp per rpm. However, for steady, non-overloading industrial drives (such as centrifugal pumps, blowers and fans) bracket-bearing construction may be used for ratings up to approximately 1.5 hp per rpm for motors in the high speed class up to 900 rpm.

The new design will shortly be made available in wound rotor and synchronous machines as well as the squirrel-cage induction motors of four and more poles.

Illinois Prepares

(*Continued from Page* 9)

a mutual aid area, so these critical target communities have been asked to establish the boundaries of their mutual aid areas in conformance with the most practical considerations.

The State Office of Civil Defense expects to work directly with defense leaders in these areas to help them establish their mutual aid boundaries, plan their mutual aid program, and organize the most effective means of bringing outside aid to them.

The term "Mutual Aid" applies to preparations and activities whereby organized communities, in accordance with legal pacts and other prearrangements, voluntarily assist one another. The basis for mutual aid is a systematic pooling of operational resources to minimize the effects of disaster and to aid recovery.

In the event of an enemy attack, the Civil Defense directors of each of the communities within the critical target area will alert units of all mobile civil defense elements in the community. These will assemble, on order, at previously designated points. Communications with the affected area will be established and the mobilized forces will stand by to await directions. They will be instructed to move into the disaster area as needed. Once these forces arrive at the scene of the attack, they will operate under the command of the civil defense authorities of that locality.

In order to assure smooth and rapid performance of such an operation, test exercises and practice runs will be held so that each unit of the assisting forces will be able to move with almost "push button" precision. Such exercises will contemplate attacks not only on the principal city of the area, but on several of the surrounding communities so that unit leaders may become familiar with lines of communications, transportation, and other logistic problems.

Now as to the next category in civil defense areas. These are cities of down to 20,000 population, not considered critical target areas. The probability that these communities are less likely to be attacked than some other areas in the state does not reduce their responsibility for civil defense, but it does indicate how they should organize.

The plan for these city areas will include as a principle objective maximum immediate aid to communities which *are* potential targets and adequate protection against sabotage in their own communities. These cities will also be asked to prepare reception centers to receive evacuees from a bombed area—wounded and non-wounded—and to provide emergency welfare services for them.

To best supply "maximum immediate aid" to a stricken area, these cities will be asked to organize mobile support teams which, as I have said, will operate in an emergency under the direction of State Civil Defense Authorities. These mobile units will consist of personnel and equipment to conduct such civil defense services as: rescue, first aid, emergency feeding, radiological and chemical defense, engineering, police and fire services. The mobile units will be trained with one objective: to be available for duty in their own locality, in another community, and in another state. The leaders of these units should be familiar with other communities in the state, in order that the teams may function efficiently in any locality where they may be required.

Now, as a final category of civil defense areas, we have those organizations which will be set up on a county basis. This plan will apply to all counties that have no cities falling with the other categories, and such counties will be organized for county-wide defense work. Organization plans for these counties will be directed almost entirely toward hospitalization and home care, shelter, and rehabilitation purposes for the injured and the homeless brought in from disaster areas, and will be organized also for the prevention of sabotage that would cripple them in carrying out their part of the state defense.

To direct the state-wide organization in conformance with all categorical plans, the State Office of Civil Defense has divided its own responsibilities into three groupings, with each group of responsibilities assigned to one of the three Deputy State Directors of Civil Defense. These deputies are, of course, responsible to the State Director of Civil Defense.

(*Continued on Page* 22)

Illinois Prepares

(*Continued from Page* 21)

Group One of the responsibilities, assigned to one of the Deputies includes (1) training of volunteer defense workers; (2) plant protection and all anti-sabotage efforts; (3) fire services; (4) police services; (5) panic control; (6) mutual aid; (7) mobile support; (8) collection and transfer points.

Group Two of the responsibilities, assigned to another Deputy, includes (1) communications; (2) air raid warnings; (3) command, or central control, posts; (4) chemical defense; (5) special weapons; (6) evacuation; (7) emergency welfare; (8) civil guard; (9) veterans' organizations.

Group Three, assigned to another Deputy, includes (1) engineering; (2) public works; (3) highways; (4) transportation; (5) rescue; (6) radiological defense; (7) medical services.

All of these divisions and allocations of responsibilities are tentative and subject to modification as the organization of the State Office of Civil Defense further develops. But in merely enumerating them I trust I have added something to your grasp of the over-all job of State Defense and its ramifications.

The job of Civil Defense, on a scale such as has been undertaken, is new to all, including those of us in the State Office. It is a job of very great magnitude indeed, and we need the help and suggestions from you and others as individuals and as organizations. Civil Defense is a responsibility of all citizens, without exception, and how well we perform the task depends on how zealously everybody pitches into it. So far we have experienced a whole-hearted willingness —and eagerness, in fact—to help, and we are very much encouraged by it as we look into the months ahead, when the program will take more definite form and people will be put to the test of active participation in their community defense planning and work.

An enthusiastic response of the people to this "call to arms" can mean tens of thousands of lives saved, and the ability to sustain the industrial contribution of the State of Illinois to the nation's fighting power and to our preservation as a free people.

Chicago Civil Defense Committee

(*Continued from Page* 11)

On the Primary Routes vehicles will have the following priority:

1. Essential vehicles.
2. Military vehicles.
3. Autos, trucks and buses engaged in the evacuation of the authorized or designated area.
4. Emergency repair vehicles.
5. Transit vehicles.
6. Vehicles carrying food and supplies essential to the well being of civilians in areas not being evacuated.
7. Other vehicles.

Travel by casual vehicles, that is vehicles seeking to evacuate without authority or vehicles seeking to enter the disaster area without authority, will be discouraged by all possible means.

Method of Control

At the alert all persons will be required to remove cars from all Emergency and Primary Routes by running them onto parkways or other non street areas. No non-essential vehicles will move until authorization is given.

The Emergency Routes will be used exclusively by essential vehicles. Crossings by other than essential vehicles may be made only at Primary Route intersections and essential vehicles will cross Emergency Routes at Primary Route intersections insofar as possible, when there will be no interference to the movement of essential vehicles. Transit vehicles will be removed from Emergency Routes as soon as possible. Non-essential vehicles may travel on the Primary Routes except when prohibited as the result of emergency conditions. All such vehicles will be diverted away from the emergency area at control points.

Upon determination of the area of incident the nearest Emergency Routes bounding the area will become the road block zone. Inasmuch as all intersections are controlled along Emergency Routes, these are effective road blocks for the purpose of stopping in coming non-essential vehicles.

At an alert the Police Department will immediately dispatch men to all intersections of Emergency Routes, Primary Routes, and intersections of Emergency Routes with Primary Routes.

(*Continued on Page* 23)

Chicago Civil Defense Committee

(*Continued from Page* 24)

At the All-Clear signal Civilian Traffic Control Guards will immediately take their stations at intermediate street intersections along Emergency Routes.

The Police Departments will patrol the Emergency and Primary Routes.

After stabilization of the emergency area has been established traffic expedients to compensate for streets out of commission will be developed and implemented by the Traffic Control Reserves.

Route Designation

Each route will give a code number for the purpose of easy assignment of personnel and designating the boundaries of an emergency area. Emergency area. Emergency Routes carry arbitrary numbers prefixed by the letter A. Primary Routes carry numbers prefixed by N. or S. W. or E. depending on their direction from Madison Street or State Street. The numbers in this latter instance represent the number of hundreds of house numbers from the city center.

Traffic Control Personnel

Traffic control personnel will be needed at all intersections along Emergency Routes. Intersections of these routes with Primary and other Emergency Routes will be controlled by the Police Department. Intermediate intersections will be controlled by civilian Traffic Control Guards. For the purpose 1500 Traffic Guards will be required to maintain one shift. It is recommended that all acquisition, training, and supervision of civilian Traffic Control Guards within the City of Chicago be handled by the Police Department of the City of Chicago and the same provisions outside the City Limits be made by State, County and Local Police Departments. It is further recommended that 300 additional Traffic Control Reserves be trained and held at designated reserve assembly areas. These men are to be used as needed during the emergency and to assist in establishing special traffic expedients. These areas are (1) Gompers Park, Foster and Pulaski (2) Columbus Park, Austin and Jackson (3) Washington Park, Cottage Grove and 55th.

The Transportation Committee is requested to assign four trucks to each Reserve Assembly Area.

Route Signing

Well in advance of the time when hostile action may be anticipated, all Emergency and Primary Routes will be marked with highly legible signs. These signs will consist of reflectorized triangles, 30 inches on a side, of red or green color, depending upon the type of route being designated and containing the route number. Red will be used to designate the Emergency Route and green the Primary Route.

Curb Parking

The capacity of routes will be seriously impaired if parking vehicles are found at the curb at the time of emergency. There would be no possibility, through the use of wreckers or other means, of removing these parked vehicles after an alert has been received. Therefore, along both curbs of all Emergency and Primary Routes curb parking will be limited to one hour from 6:00 A.M. to 1:00 A.M., with no parking allowed from 1:00 A.M. to 6:00 A.M. This regulation should be made effective as soon as Chicago's civilian defense plan is approved or as soon as the imminence of an emergency is recognized.

Communication and Reconnaissance

The success of any emergency traffic plan will be strongly influenced by the effectiveness of intelligence and communications. It must be assumed that normal channels of communication will be destroyed in part or in whole. It must also be recognized that once traffic blockage begins to develop in any area traffic control personnel on duty at intersections will be unable to identify accurately the cause and location of traffic stoppage. The Chicago Motor Club will have between 26 and 35 emergency patrol vehicles equipped with short-wave radio under the control of a central station located in the Chicago Motor Club Building at 66 E. South Water Street. These vehicles will be sufficient to patrol the 23 evacuation routes to report the location and cause of traffic blockages, the location of road damage and to assist in emergencies in the movement of disabled vehicles that are interfering seriously with traffic movement. In addition, the Chicago Motor Club has available a helicopter equipped with a radio operating at the same wave length which will be used for aerial reconnaissance and reporting the general location of traffic blockages within the city. Such information in outlying areas will be furnished by small airplanes. Upon the receipt of an official request, the Chicago Motor Club will examine the feasibility of tuning the radios in the patrol cars and helicopter to the wave lengths of the county police stations which constitute the three auxiliary headquarters of the Traffic Planning Committee or establish a special auxiliary transmitter and receiver at a point designated as an auxiliary headquarters by the Traffic Planning Committee. This auxiliary central station would be required in the event of the destruction of the station in the Motor Club Building.

Automatic Transmissions for Automotive Use

(*Continued from Page 7*)

with a hydraulically operated transmission to obtain the various ranges—Park, Neutral, Drive, Low, and Reverse. The torque converter drives the car through a compound planetary gear cluster which is locked-up by a multiple disc clutch for all normal operation. When the range selector lever at the steering wheel is set to Low Range, oil pressure applies the low band, thereby holding one of the planetary reaction members producing a geared reduction of 1.82:1.

Low range is used for emergency power and for increased engine braking while descending long steep grades.

Reverse Range is obtained in a similar manner by applying the reverse band which locks a different reaction member of the planetary.

To supply oil under pressure to operate the high clutch piston, low and reverse servo pistons, and to circulate oil through the converter and lubrication system, two pumps are used. One is driven at engine speed and the other at propeller shaft speed. The latter is a small pump which supplies all the oil required when the car speed is high enough for it to do so. The oil from the larger pump is then relieved to the oil suction line so that a minimum amount of power is needed for pumping. The rear pump which is run at propeller shaft speed is necessary to provide oil pressure to one of the friction elements to obtain a drive through the transmission when a car needs to be push started, as in the case of a weak battery.

At the rear of the transmission is a parking lock which will rigidly lock the propeller shaft when the car is parked. This takes the place of parking a synchromesh equipped car 'in gear.' In addition this enables the engine to be started while the transmission is still in the park position. A fluid drive car cannot be parked with the engine locked to the rear wheels because there must be a speed difference between the fluid drive and driven members before any torque transfer can be made.

The operation of the Chevrolet's Power Glide Transmission is pretty much the same as Buick's Dynaflow. The construction of the transmission differs but accomplishes the same result. The principle difference is the sheet steel converter, but that is another story.

Crerar Library

News and Notes

The history of engineering is well represented in the Crerar collections. One field unusually well represented is the history of railroads. A recent purchase of marked interest is a collection from the private library of the late Edward Francis Carry.

There are more than two hundred items dealing principally with early British and French railroads, but also including a number of items of American interest. Among these are ten rare pamphlets on the railroads of New York chester and Liverpool in 1830."

Some of the most notable pieces are a magnificent set of Bradshaw's maps of canals, navigable rivers and railroads in England in the 1830's; a rare map of the railroads of central Europe in 1851; and a collection of fifty-nine letters signed by men connected with early British railroad history. The latter include Matthew Bolton, George and Robert Stephenson, and William Huskinson. The latter was "killed on the first trial of a railway carriage between Manchester and Liverpool in 1830."

Unique items are four early manuscript documents on vellum, each being one of the three original copies required by British law. These are: the indenture for the Great Central Irish Railway (1838), the subscription contract for the Norwich and Brandon Railway Company (1845), the original petition to the House of Lords for a branch of the North British Railway from Hawick to Carlisle (1836), and the original petition to the House of Commons requesting a loan of 50,000 pounds to continue construction of the railroad from St. Andrews to Quebec, Canada, a road that later became part of the Canadian Pacific.

The former owner of this collection, Edward Francis Carry, who died in 1929, had a varied career in the transportation field, having served as president of the Haskell & Barker Car Co., and The Pullman Company. During the First World War he served as vice-chairman of the Shipbuilding Labor Adjustment Board and also as director of operations, U. S. Shipping Board.

Memos on WSE Members

Here are more changes collected while preparing the 1950-51 Yearbook, Again, it is impossible to tell which are up to the minute and which are not. Please send in any news about yourselves or other WSE members. Let's hear from the out-of-towners.

E. C. Shuman is now Director of Research, Kaylo Division of Owens-Illinois Glass Co., in Toledo, Ohio . . . . *E. Roy Wells* handles his own consulting engineer business in Geneva, Illinois . . . . and *W. W. Wishard* is Assistant Chief Engineer, Commonwealth Edison Co . . . . *William J. Santina* has received the promotion of Chief, Reports and Hydraulics Branch, Senior Hydraulics Engineer, the U. S. Engineer's Office . . . . *George P. Stacy* now works for Allied Concrete Supply Co., where he is Sales Engineer . . . . New Vice-President of Anning—Johnson is *Warren C. Wheeler* . . . . Another new v.p. is *Edward J. Wolff* of the Electrical Service Engineering Co . . . . *Thurman A. Phillips* is now a designer with the U.S. Gypsum Co. Mr. Phillips was formerly with Sargent & Lundy . . . . *Wesley W. Polk* is now consulting engineer in Springfield. . . . *Robert L. Plummer, Jr.*, is associated with General Electric Co., as a Consulting Industrial Engineer . . . . *William E. Slack* is Production Engineer at the Anglo Corp . . . . *Thomas P. Newman* has been promoted from engineer of Pottery & Enamelware, to supervisor of the Crane Co . . . . Another promotion is *Harry E. Noren's*, formerly Assistant Engineer of Tests, he is now Engineer of Tests (Electric), at the Public Service Co. of Northern Illinois . . . . *Arthur E. Siewerth* is now President of Arthur G. Siewerth Sons . . . . *Milton Murr* is Resident Engineer Corps, U.S. Army . . . . Some former students that have graduated and now are hard at work are: *Ernest W. Nordquist*, in the training program of Proctor & Gamble . . . . *Melvin L. Orloff*, Junior Industrial Engineer, Carnegie-Illinois Steel Corp.

John T. Rettaliata, Dean of Engineering of IIT, acted as Toastmaster at a luncheon of the ASME in, Buffalo November 29. The lunchen speaker was Mr. George V. Tenny Jr., moderator of the Town Meeting of the Air.

The WSE staff wishes every member the Season's Good Wishes.

Mr. J. N. Stanbery, vice-president of Illinois Bell Telephone Company, and a Western Society of Engineer's member since 1941, now represents WSE as vice-chairman of the Chicago Advisory Committee of the Engineering Societies Personnel Service. Mr. Stanbery has been a member of this committee since 1947.

Obituaries

Harry H. Hadsall, WSE member since 1899, died November 16, 1949. Mr. Hadsall had been vice-president of Leonard Construction Co. and engineer of bridges and buildings with the Illinois Central Railroad. He was an active member of the Bridge and Structural section of WSE.

R. A. Whitney, of the Western Society of Engineers since 1927, died on October 31, 1950. Mr. Whitney was a construction engineer with the Public Service Co. of Northern Illinois. Mr. Whitney was active on WSE committees during his years as member of the Society.

By Way of Explanation

If you have wondered why the November issue of the Midwest Engineer was so tardy, and included a fullpage ad on the Barnyard Party, over long before you received your magazine, here is the reason why. According to postal laws, the Yearbook had to be published as a part of regular issue of the Midwest Engineer. The Midwest Engineer November issue was planned and printed in plenty of time to reach the members around the first of November. However, an unexpected delay in printing the Yearbook caused the November issue to be late.

Special notices of the Barnyard Jambourie were mailed, and approximately 150 mebers, family and friends enjoyed themselves at this Fall frolic.

Refresher Course Starts Jan. 8

Another structural engineering refresher course is scheduled to start Monday, January 8, 1951. The Western Society of Engineers and the Illinois Section of the American Society of Civil Engineers sponsor this refresher course, in cooperation with the Division of the University Extension, University of Illinois.

Classes will be held every Monday and Thursday from 6:30 to 8:30 p.m., from January 8 through March 1.

Instructors of the course will be members of the University College of Engineering faculty and practicing engineers. Tuition fee is $11.50, payable the first night of class. Checks should be made payable to the University of Illinois.

J. Calvin Brown, New ASME Head

The election of J. Calvin Brown, engineer and patent attorney of Los Angeles, as president of The American Society of Mechanical Engineers for 1951, was announced at the Society's 71st annual meeting in the Hotel Statler in New York. Mr. Brown will take office at the conclusion of the meeting on Friday, December 1, together with four regional vice presidents and two-directors-at-large who were also elected.

The new president will succeed James D. Cunningham, (WSE) of Chicago. A mechanical engineer and attorney at law specializing in patent, trademark and copyright litigation, Mr. Brown became a member of the ASME in 1928. He served as manager of the society in 1943-44 and as vice president from 1945 to 1949. Mr. Brown has been active in the affairs of the ASME Southern California Section.

Dr. John T. Rettaliata, dean of engineering, Illinois Institute of Technology, and member of the Western Society of Engineers was elected a regional vice-president.

De Leuw, Cather Direct Study

Plans for rehabilitation of the Royal State Railways of Thailand will be checked for suitability and adequacy by American engineers prior to the starting of the improvements, it was learned today. T. C. Fredrick, Chief Engineer and H. P. Watson, Chief Mechanical Engineer for De Leuw, Cather & Company, consulting engineers, left Chicago for Bangkok on November 20 to direct the study.

A Bomb Problem Solved by Traffic Engineers

(*Continued from Page* 13)

Suburban Emergency Route Ill. 64 connecting with A 9 was not cut off but suffered severe congestion until the south blockade limit of the north air burst was moved from A 9 to N 24 and N 8 was designated as an Auxiliary Emergency Route.

Suburban Emergency Route Ill. 4A connecting with A 16 was cut off by the ground burst and was re-routed over 39th Street.

Suburban Emergency Route Ill. 1 connecting with A 3 was cut off by the south air burst and was re-routed over new A 4 to A 3. This caused A 3 to be congested (as it was the east blockade boundary) until A 4 was extended east on 130th Street and a new Emergency Route was established on Stony Island Avenue.

Restoration of Normal Service

Because the Traffic Plan cut down normal traffic drastically there was need to restore normal traffic as soon as possible. Reports of the use of various routes by essential vehicles was reported to Traffic Planning Headquarters. Reports of street clearance and repair were also assembled and plotted.

From time to time recommendations based on these reports of conditions were made to the Central Control Center for the lifting of restrictions and restoring streets to normal service.

As soon as accurate information could be assembled giving the condition of streets and structures in the damaged areas priority of clearance repair and replacement was established. In general, first preference was given to Emergency Routes, second to Primary Routes and last to local streets.

Losses

It is estimated that loss of personnel of the Traffic Planning Committee due to death and injury was only about ten per cent. However, only about twenty-five per cent of the personnel were able to report to their assigned posts on the first day. This percentage was later raised to fifty per cent.

Book Browsings

Student Thermodynamics

Thermodynamics, By Edward F. Obert, McGraw-Hill Book Company, Inc., New York, First edition. 1948, 571 pp., $5.50.

This thermodynamics for engineering students is quite extensive, detailed, and up-to-date in both concept and execution. The publisher has aptly stated, "the book offers adequate material on air conditioning, refrigeration, gas turbines, etc., so that specialized courses in these fields are unnecessary in the undergraduate curriculum. An aim of the book is to provide certain essential material that must be understood by the practicing engineer, and considerable stress is placed upon real machines, flow processes, and the properties of fluids. The illustrations are drawn in a manner to aid in the solution by emphasizing the concepts of the system and the surroundings." Special treatments are given to availability, second-law analyses, and reversibility.

H. H. F., W. S. E.

Turbine Design and Cycles

Steam Turbines and Their Cycles, by Kenneth Salisbury, John Wiley & Sons, Inc., New York, 1950. 645 pp. $9.00.

This book will fill a void in many individual and group libraries. Part 1 is devoted to turbine design, including thermodynamics, cycles, flows, turbine types and characteristics, stage efficiency and design, and steam-path design. Part 2 is devoted to the regenerative cycle, including regeneration and non-extraction performance, modern and conventional heat-balance, short cut to heat rate, and fractional extraction. Part 3 is devoted to cycle analysis, including heater losses, equations, cycles, and arrangements; distribution loss, terminal difference, and pressure drop loss. Part 4 is devoted to application engineering, including design details, steam rates, and heat rates. Appendix and index seem well planned to make a working entity of the book, but a select bibliography is added for those who wish to search the earlier literature.

The author has been with General Electric Company for 20 years, since receiving two degrees from the University of Michigan; in 1947, he became Division Engineer of the Thermal Power Systems Division. This book is the outgrowth of educational work which he undertook during the past war. When used for college work, he recommends part 1 for undergraduate work in design of steam turbines, part 2 for a second course, and parts 3 and 4 for graduate work. The author believes that his book "will be of greatest usefulness to the practicing engineer in the steam power-plant field", due to the contents of parts 3 and 4. Many engineers who have been looking for an adequate book on modern turbine design are likely to agree with him.

H. H. F., W. S. E.

Electrical Engineers' Handbook Volume 1

Electrical Engineers' Handbook, Fourth Edition, Vol. I Electric Power, edited by Harold Pender and William A. Del Mar. John Wiley & Sons, New York. 1949. 1,716 pp. $8.50.

Pender's handbook has been in continuous use by electrical engineers since 1914. In the third, or preceding, edition it filled 2 octavo volumes of the well known Wiley series of engineering handbooks. The 2 volumes now contain some 3,300 pages and nearly 2,500 illustrations. The fourth edition has been enlarged, rearranged and completely rewritten; some of the new material is mentioned below. It has been the aim to include practically all the fundamental reference material required by electrical students or engineers. Each volume is complete in itself and can be bought separately; apparently the only duplication of content is the first two sections on the general subjects of mathematics and materials. (This paragraph applies also to Volume II, reviewed after this one.)

Volume I contains 19 sections (or chapters) devoted to such subjects as: circuits, machinery, equipment, power stations, substations, transmission, distribution, metering, testing, lighting, heating, motors, aircraft equipment, electrochemistry, welding, and rural electrification. Increased attention has been given to subjects which have become more important in recent years, including: circuit stability, symmetrical components, electronic rectifiers, aircraft equipment, heat pumps, servo-mechanisms, permanent magnets, plastic insulation, induction heating, and dielectric heating.

In general, each section was prepared by a group of specialists, of whom 71 collaborated in producing volume I. Each section is followed by a short bibliography. Volume I also contains 977 illustrations.

H. H. F., W. S. E.

Electrical Engineers' Handbook Volume 2

Electrical Engineers' Handbook, Fourth Edition, Vol. II Electric Communication and Electronics, edited by Harold Pender and Knox McIlwain. John Wiley & Sons, New York. 1950. 1,618 pp. $8.50.

The first paragraph regarding volume I also applies to volume II.

Volume II contains 23 sections (or chapters) devoted to such subjects as: circuit components, electron tubes, vacuum

Book Browsings

Books Available at WSE Headquarters

tubes, electric circuits, transmission circuits, frequency modulation, pulse techniques, measurements, acoustics, acoustic devices, optics, electro-optical devices, sound reproduction, telephony, telegraphy, submarine telegraphy, facsimile, television, electronic control, air navigation, marine navigation, and medical applications. New or enlarged discussions have been given to these items among others: antennas, filters, acoustic devices, optical devices, recording and reproducing devices, diathermy, ultraviolet, infrared, high-voltage shock, and X-ray burn.

In general, each section was prepared by a group of specialists, of whom 77 collaborated in producing volume II. Each section is followed by a short bibliography. Volume II also contains 1,497 illustrations.

H. H. F., W. S. E.

UHF Practice

Ultrahigh Frequency Engineering, by Thomas L. Martin, Jr. Prentice-Hall, Inc., New York. 456 pages.

This book covers the electronic devices of UHF practice, which in various combinations are applied to radar, television, telemetering, aircraft instruments and computing machines. Methods of generating UHF energy by the use of ordinary thermionic tubes, Klystrons and magnetrons are discussed. An extensive treatment is accorded to circuits for wave-shaping and pulse-shaping, amplifiers and trigger circuits. A review of the classical theory of transmission lines is developed into the special application of resonant lines at high frequencies. Wave guides and cavity resonators are covered at length, and a final chapter outlines briefly the fundamentals of propagation of UHF radiations.

As an engineering text, this volume necessarily makes full use of mathematics. It should be useful to engineers in electronic fields which involve the application of ultra-high frequencies.

W. F. L., W. S. E.

Hot Water Coil Method for Melting Snow

Snow Melting, by T. Napier Adlam. The Industrial Press, New York, 1950. 224 pp. $4.50.

The vice-president of the Sarco Manufacturing Corporation has written a comprehensive and valuable reference book on the design, installation, and control of systems for melting snow by hot-water coils embedded beneath walks, roads, or other areas where snow is an obstruction or hazard. Some information also is given on the use of buried electric cable as the heat source. The territory covered is United States, Alaska, and Canada.

Practically all pertinent data are given on weather, quantity and quality of snow, melting media, heat transfer devices, and automatic controls for starting and stopping the application of heat. Plenty of pictures clarify the author's descriptions. Tables and charts make available the accumulated experience of industrial and governmental researchers. The final chapter gives 19 steps for designing a new project, naming chapter, table, and chart to use for each step.

H. H. F., W. S. E.

Socialized Medicine

Compulsory Medical Care and The Welfare State, by Melchior Palyi. National Institute of Professional Services, Chicago, Illinois, 156 pp. $2.00.

The subtitle states that this book is based on a special study of governmental medical care systems in Europe and in England. The author is a well-known economist who has spent about half his life in Europe, and half in the United States, where he now resides in Chicago. Probably he is especially well qualified to make such a study, on account of his intimate acquaintance with economic and social trends on both continents, and also that he has what might be termed a first-hand knowledge of the growth and quirks of this subject, since its inception in the new Germany of Bismarck in the early 1880's.

From the point of view of the engineer this subject is no less interesting than to the economist. The possible effects on wage-rates, payroll expense, labor efficiency, and absenteeism have usually been surprising, and more so in the more comprehensive schemes.

On the overall financial aspect, the author says: "The provision of health care is the most unruly—least controllable— element in spending for the *security* of the individual . . . Commercial insurance can raise its premiums and lower its services to maintain its balance. Compulsory systems can scarcely go back on the services they once have established . . . The abolishment altogether of a compulsory sickness scheme, once established, even if bankrupt and unsatisfactory is beyond imagination. It never has happened."

The reason that the citizens are not yet alarmed is explained in a later chapter where it says: "Most schemes still are partial or limited experiments. That goes a long way to explain why they do not arouse the public. But since World War II, the trend is apparent toward making them as comprehensive as is politically feasible . . . The remarkable thing is not that the comprehensive schemes work badly, but that they work as well as they do."

H. H. F., W. S. E.

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Here are the rules:

Any member of Society may compete regardless of grade of membership.

Papers shall not be highly technical in nature. A clear, concise and interesting coverage is desired rather than complex formulae or derivations. The subject discussed should be of general interest to engineers but should not be of a political or highly controversial nature.

All members of the Society who wish to submit papers in this contest should contact the Secretary as early as possible and not later than February 1, 1951, and request a copy of the rules governing the competition and an outline of the minimum requirements for acceptance of papers. These cover in detail the mechanical make-up which should be followed in preparing and submitting papers for the contest.

Papers must be submitted to the Secretary for acceptance by April 1, 1951. If the Secretary finds that they meet the minimum requirements of the contest, he will forward them to the Awards Committee for review. The papers will be identified by number only. The Secretary of the Society is the only person who will maintain the key to the authors.

If any paper does not comply with such minimum requirements, the Secretary will so advise the author and discuss with him the points which are below the minimum requirements. The papers which are accepted will be forwarded to the Awards Committee for judging not later than May 1, 1951. Papers which have not met the minimum requirements by that time cannot be considered for prizes.

Papers which are accepted will be judged on originality of presentation, editorial merit and value to the engineering profession.

The papers submitted must not have been previously published in substantially the same form. No copyrighted materials shall be used unless permission has been obtained and so indicated. All manuscripts, drawings, etc., are to become the property of the Society and cannot be published without the consent of the Society.

If the papers submitted are NOT of sufficient merit to warrant the award of any or all of the prizes, the Awards Committee reserves the right to award less than the three established prizes or to postpone the competition.

The winners will be announced and the prizes presented at the annual meeting of the Society in June, 1951.

WSE Executive Secretary will furnish you with a complete set of rules and minimum requirements on request.

WSE Applications

In accordance with the By-laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office, 84 E. Randolph St., RA ndolph 6—1736.

72-82 Vernon T. Kempf, Electrical Engineer, Joseph T. Ryerson & Son, Inc., Box 8000-A.

73-82 J. Richard Koehler, 205 N. Leamington Ave., attending Illinois Institute of Technology.

74-82 Charles M. Young, Jr., Chief Development Engineer, Link-Belt Co., 301 W. Pershing Rd.

75-82 Robert P. Cowsert, Student Engineer, Chicago Transit Authority, 79 W. Monroe St.

76-82 Vincent A. Schorsch, Field Engineer, Public Service Company of Northern Illinois, 1701 S. First Ave., Maywood, Ill.

77-82 Wayne C. Christensen, 2805 N. Leavitt St., attending Illinois Institute of Technology.

78-82 Thos. J. Heavey, President & Treasurer, Thos. J. Heavey, Inc., 337 W. Madison St.

79-82 Roland E. Wallin, Engineer in Charge of Constr'n., Jos. T. Ryerson & Son, Inc., 2558 W. 16th St.

80-82 Perry B. Hoagland, General Plant Personnel Supr., Illinois Bell Telephone Co., 208 W. Washington St.

81-82 John G. Vaughan, Jr., Director of Development, Chicago Housing Authority, 608 S. Dearborn St.

82-82 Milton H. Koeneman, Chief Draftsman, Laclede Arch Company, 5 S. Wabash Ave.

83-82 Charles C. Post, Sales Engineer, Duparquet, Inc., 225 N. Racine Ave.

84-82 Harvey A. Nelson, Electrical Engineer, Wadeford Electric Co., 205 W. Wacker Dr.

85-82 Lee W. Clark, 129 Millview Ave., Kalamazoo, Mich. attending Illinois Institute of Technology.

86-82 Alf R. Palm, Struct'l. Designer & Field Engr., A. J. Boynton & Co., 109 N. Wabash Ave.

87-82 William A. Zirzow, Electrical Construction Engr., Hoffman Electric Co., 2525 W. Van Buren St.

88-82 Deward J. Fitzhugh, 5017 S. Loomis St., attending Illinois Institute of Technology.

89-82 Walter P. Becker, Secretary (Engr.), The Okadee Co., 332 S. Michigan Ave.

90-82 Joseph P. McCluskey, Graduate Engr. in Training, Public Service Company of Northern Illinois, 72 W. Adams St.

91-82 Harold K. Smith, Consulting Engineer, 53 W. Jackson Blvd.

92-82 Robert J. Lee, Sales Engineer, General Electric Co., Lamp Dept., 231 S. LaSalle St.

93-82 James F. Judd, Project Engineer, Chicago Carton Co., 4200 S. Crawford Ave.

94-82 R. Charles Martini, Designer, Holabird & Root & Burgee, 180 N. Wabash Ave.

95-82 Ernst H. Anderson, Electrical Engineer, L. E. Meyers Co., 53 W. Jackson Blvd.

96-82 Arthur H. Trinkle, Engineer-Draftsman, Laclede Arch Co., 5 S. Wabash Ave.

97-82 Richard A. Dragoo, Draftsman (Elect'l.), Atchison, Topeka & Santa Fe Railway Co., 80 E. Jackson Blvd.

98-82 Elliott A. Johnson, Engineer; Helco, Inc., 1215 W. Fullerton St.

99-82 Anthony J. Racich, 3628 Penn. Ave., East Chicago, Ind., attending Illinois Institute of Technology.

100-82 Chester W. Bruce, Assistant Chief Engineer, Republic Steel Corp., 116th St. & Burley Ave.

Engineering Societies Personnel Service, Inc.

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These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated. Prepared ENGINEERS AVAILABLE advertisements limited to 40 words, with typed resume attached may be submitted to ESPS Chicago by members of Western Society of Engineers at no charge.

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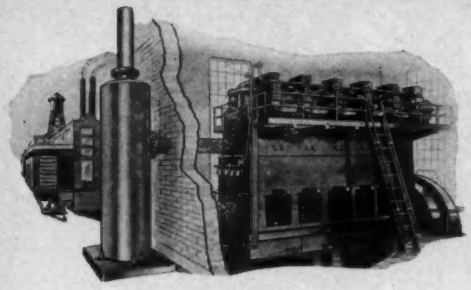

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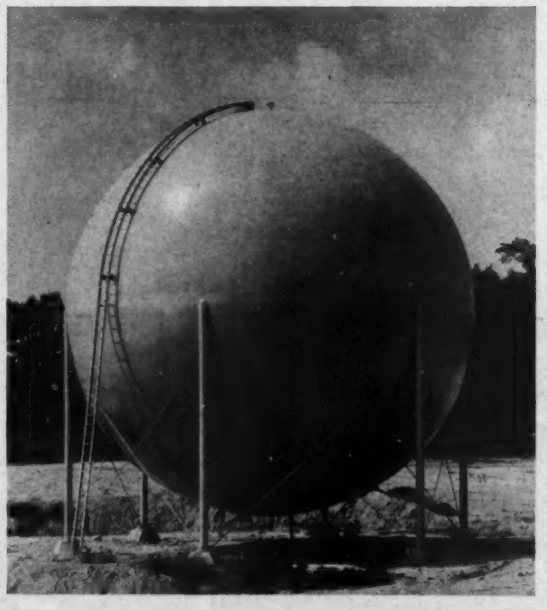

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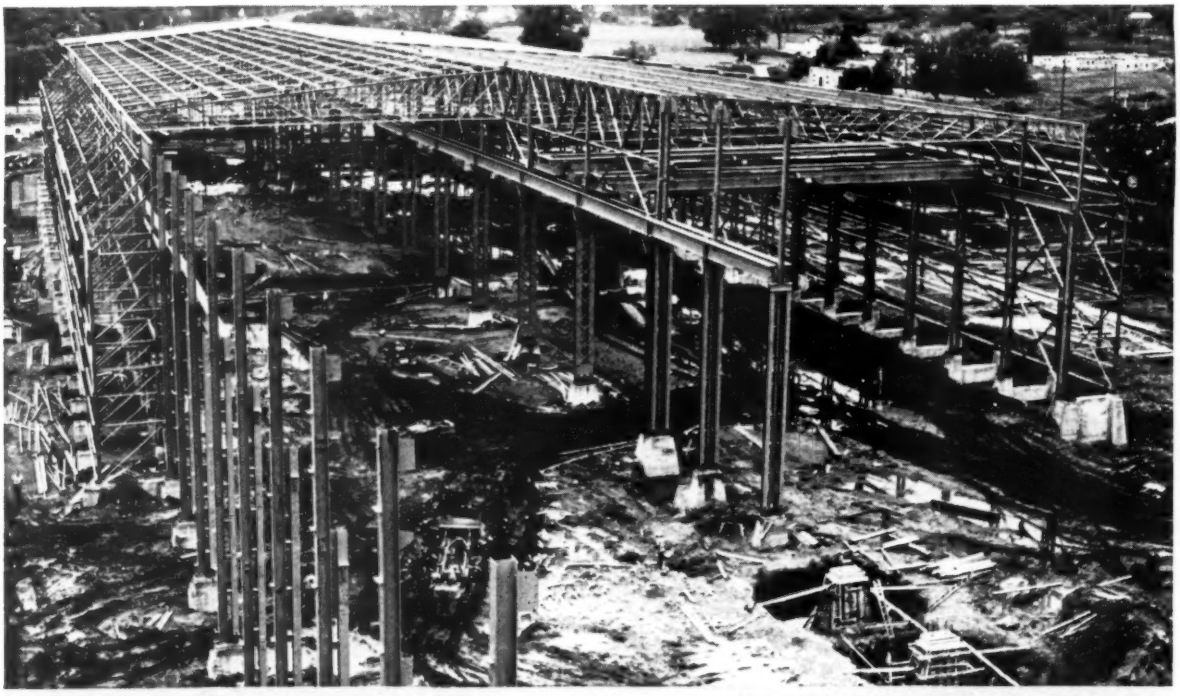

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